Chapter 1: Health Effects of Exposure to Asbestos

HEALTH EFFECTS OF EXPOSURE TO ASBESTOS

Sections:

Background Information and Health Effects Presentation

Characteristics of Asbestos and Health Effects of Asbestos Exposure

CHARACTERISTICS OF ASBESTOS
AND
HEALTH EFFECTS OF ASBESTOS EXPOSURE

CHARACTERISTICS OF ASBESTOS

Asbestos is a naturally occurring mineral. It is mined in many countries, including the Soviet Union, Canada, South Africa, Rhodesia, and the United States. Over 30 million tons of asbestos have been utilized in the United States since the beginning of the twentieth century.

There are two major types of asbestos: serpentine and amphibole. These forms differ in chemical structure, resulting in different physical and biological properties. The serpentine form is long, narrow and curved, while the amphibole form is shorter, wider and straight. Chrysotile is the predominant form of the serpentine type in commercial use and accounts for 95% of the commercially used asbestos in the United States. The other two most common forms of asbestos are crocidolite and amosite. Both of these forms are members of the amphibole group.

Asbestos has a number of physical and chemical characteristics that have made it very useful in a variety of settings. It is naturally heat resistant, pliable and very strong. Because it is fire resistant and has excellent insulating properties, the uses of asbestos are broad.

HISTORY OF ASBESTOS USE

Asbestos has been used since Roman times. The commercial use of asbestos began in the mid-nineteenth century and grew rapidly with the increased industrialization of the workplace. Asbestos was used extensively in the 1940's in shipbuilding and other wartime uses. Following World War II, its use continued to grow. Asbestos can be found in more than 3,000 different products.

The uses of asbestos are varied. It has been used in the manufacture of heat resistant clothing, automotive brakes and clutches, and a variety of building materials. These materials include floor tiles, roofing felts, ceiling tiles, asbestos-cement pipe and sheeting, and fire resistant dry wall. It can also be found as insulation material on pipes and boilers, and in sprayed-on materials located on beams, in crawlspaces and between walls.

Although asbestos was used for a wide variety of building materials, newer buildings constructed in the 1980's do not contain as much asbestos as older ones. In addition, the asbestos only poses a health threat when it can release fibers into the air. Fiber release could occur because the material is in poor condition, or when a building containing asbestos will undergo demolition or renovation.

HEALTH EFFECTS OF ASBESTOS

Asbestos is dangerous when you breathe it. When asbestos is crushed, it does not make ordinary dust, like other rocks. Instead, asbestos breaks into tiny, sharp microscopic fibers. You cannot see, feel, or taste asbestos fibers. Because the fibers are so small, they can easily get into your lungs.

Asbestos exposure means breathing asbestos fibers. If you are in an area where asbestos is in the air and you are not protected, then you are exposed.

Asbestos exposure causes the following diseases:

1) Asbestosis
2) Lung Cancer
3) Mesothelioma
4) Other Cancer of the Digestive System

Each of these diseases will be discussed in detail; however, one characteristic that each of these diseases has in common is a **latency period**. A latency period is the gap between the time of asbestos exposure and the time you start to feel sick. The latency period for asbestos diseases is between 10 to 40 years.

How much asbestos is dangerous? Unfortunately, there is no amount of asbestos that has been proven to be safe. However, the higher your exposure to asbestos, the more likely you are to develop an asbestos-related disease. All of the asbestos diseases are **dose-related**, except mesothelioma. Dose-related means the more asbestos you breathe; the more likely you are to get sick.

Asbestos diseases are very difficult or impossible to treat. The only cure for most asbestos diseases is to prevent them.

Let's take a look at each disease related to asbestos exposure.

Asbestosis

Asbestosis is a progressive scarring of the lung tissue involved in air exchange. This scarring, that can continue even after asbestos exposure, can weaken and destroy the lungs.

When you breathe in asbestos fibers, they go deep into the lungs. The fibers are skinny, sharp and jagged. They dig into the lungs like tiny needles. The body forms scars around the fibers, and the scarred lungs cannot get oxygen into the blood.

Cancers of the Digestive System

Many other cancers are more often found in asbestos workers than in people who do not work with asbestos. These cancers include cancers of the digestive system, such as the mouth, esophagus, stomach, colon and rectum. These cancers are dose-related.

Symptoms of these digestive cancers vary, but include change in bowel patterns, blood in bowel movements, fatigue, and weight loss.

As you can see, asbestos is silent but deadly. Those who are exposed do not become sick immediately, but may 10 to 40 years later.

If you work with asbestos or are exposed to asbestos, you can take steps to protect yourself. Wear the proper respiratory protection and personal protective equipment to reduce exposure. If you smoke, get help to quit! In addition, see your physician on an annual basis.

Asbestos Case Study for North Carolina Workers Compensation Act

Mother:	Born 10/53	Died 6/95	Age 42	**Plaintiff**
1 Child	Born 3/84	Age 11 at Mother's Death		
2 Child	Born 7/87	Age 8 at Mother's Death		
Father	Alive but information not available			

Mother exposed to dust on her fathers' clothing as a child. Father did maintenance at a tire plant.

Mother worked at NC School System for 4 years as a secretary (5/78-10/81)

The School was an old building containing asbestos building materials that had a lot of renovations during her employment.

Mother became ill in 12/92, had surgery in 4/93 (Removal of Right Lung and Chemotherapy), and died in 6/95 from Mesothelioma.

Mother's weekly income was $241.15 so she would qualify for a weekly compensation rate of $160.77 per week.

The reward is as follows:

Father received:	$55.59 x 400 weeks = $ 22, 236.00
1 Child received:	$55.59 x 400 weeks OR until age 18 = 20, 234.76
2 Child received:	$55.59 x 400 weeks OR until age 18 = 22, 236.00
Burial Expenses:	$ 2000.00

The award to the family amounted to $ 66, 706.76.

Minus the Attorney's Fees of 25% that amounted to $ 16, 676.69

$66, 706.76
-16, 676.69

$ 50, 030.07 Total Awarded To The Family

NOTE: $150, 000 Medical Expenses Were Paid By Defendants

Chapter 2: State and Federal Asbestos Regulations
(No Additional Reference Materials)

Chapter 3: Asbestos Hazard Emergency Response Act (AHERA)

ASBESTOS HAZARD EMERGENCY RESPONSE ACT (AHERA)

Sections:

AHERA Regulation Presentation

LEA Designee Responsibilities
Training Requirements Under AHERA
The School Report: Public Relations and the LEA Designee

LEA DESIGNEE RESPONSIBILITIES

The Asbestos-Containing Materials in Schools Rule (40 CFR Part 763, Subpart E), promulgated by the U.S. Environmental Protection Agency (EPA) in October 1987 under the Asbestos Hazard Emergency Response Act (AHERA) of 1986, specifies the responsibilities of the Local Education Agency (LEA) designee. The designee is the person who will ensure that the LEA complies with the 1987 Asbestos School Rule. This section will highlight those portions of the rule that the designee should concentrate on to ensure compliance. In addition, responsibilities that go beyond the Rule are discussed.

Stated Designee Responsibilities

Section 763.84 of the AHERA rule is titled "General Local Education Agency Responsibilities". Paragraph A requires the LEA to ensure that the performance of inspections, reinspections and periodic surveillances, the development and update of management plans, and the development and implementation of response actions, including operations and maintenance, be carried out in accordance with this Rule.

Paragraph B states that the LEA will ensure that all custodial and maintenance staff are properly trained. The training requirements are discussed in the training section of this notebook. The immediate concern of the designee is to identify those individuals that are required to have training. The LEA designee may conduct the required training or locate a training provider to provide the training.

Paragraph C requires annual notification to workers and building occupants, or their legal guardians, regarding asbestos management activities (i.e., inspections, reinspections, response actions and post-response action activities, including periodic reinspection and surveillance activities) that are planned or in progress in the school.

Paragraph D requires the LEA to notify all short term workers (e.g., telephone repair workers, utility workers or exterminators) of the location of asbestos-containing building material (ACBM) and suspected ACBM assumed to be asbestos-containing material (ACM) if they are likely to come in contact with asbestos in a school. Going beyond this requirement, it would be wise to ensure that those workers are properly trained to work around asbestos without creating a hazard for themselves or others in the same environment.

Paragraph E says that the LEA must post warning labels adjacent to any ACBM and suspected ACBM assumed to be ACM located in routine maintenance areas at each school building. The designee can work with the inspector or management planner to identify these areas, then ensure that those areas are posted.

Paragraph F requires the LEA to have a complete, updated copy of the management plan available for inspection at the LEA administrative office and the school administrative office. Annual written notification to parent, teacher and employee organizations of the availability of the management plan is also required of the LEA. The designee will want to ensure that someone in the office knows what the plan is and where it is located.

Paragraph G of this section states that the LEA shall designate a person to ensure that the requirements of the section are properly implemented. Additionally, the LEA must ensure that

the designated person receives the appropriate training to perform his/her duties. The training course content is listed in this paragraph.

Paragraph H indicates the LEA should consider potential conflict of interest that may arise from the interrelationship among accredited personnel and whether that should influence the selection of accredited personnel to perform activities under this Rule.

Implied Designee Responsibilities

From a practical standpoint the designee must be considered the LEA's AHERA program manager. By implication, the designee will be the one person that will be expected to be aware of the entire scope of the AHERA law and rule.

The following is a discussion of some activities in which a designee may expect to become involved beyond the stated requirements of the AHERA rule.

The 2-hr awareness training requirement for custodial and maintenance staff requires that the trainees be shown the locations of ACBM in the buildings in which they work. In most situations it will be the responsibility of the designee to learn of these locations (probably from the management plan) and provide this information to the trainees.

The designee can expect to spend a fair amount of time acting as an information officer. It may be necessary to communicate with parents, teachers, employees, administration, and the press about the status of the program, resources to implement the program, emergency response, etc. Obviously, it will be critical for the designee to be up-to-date on all asbestos management efforts within the LEA.

At some point the LEA will be awarding contracts for performance of asbestos-related services. The designee can be instrumental in selection and negotiation with consultants and contractors. The value of the designee in this process will be dependent on his/her knowledge of the services being contracted for, the regulatory requirements involved, and general negotiating and contract skills. Section 11 deals with selecting and negotiating with asbestos consultants and contractors.

It must be remembered that the AHERA management plan, and the asbestos management program in general, is on-going as opposed to static. The majority of the designee's work may be implementation of the plan. It's the designee's responsibility to ensure that the management plan is kept up-to-date (i.e., periodic surveillance, reinspection and completed response actions information inserted), that the plan's asbestos management provisions are followed (i.e., operations and maintenance plans implemented, response actions completed), and that any other on-going activities required in the plan or the rule are conducted.

The LEA designee is responsible for keeping the LEA's asbestos management program on track. A good working knowledge of the rule will be essential for the designee, as will familiarity with the workings of an asbestos management plan. Possibly the most important factor in the success or failure of the designee's efforts, however, will be the possession of good managerial skills.

TRAINING REQUIREMENTS UNDER AHERA

Proper training for persons working in school buildings containing asbestos is an important step towards compliance with the 1987 Asbestos-Containing Materials in Schools Rule (40 CFR Part 763 Subpart E), commonly referred to as the AHERA Rule. Section 763.84(a) of the AHERA Rule requires the Location Education Agency (LEA) to ensure that activities of any persons who perform inspections, reinspections, and periodic surveillances, develop and update management plans, and develop and implement response actions, including operations and maintenance, are carried out in accordance with the Rule. Throughout the Rule, it calls for use of accredited personnel to perform specific tasks and properly trained school personnel who work in school building containing ACBM. The LEA Designated Person is responsible for ensuring compliance with the Rule.

As the responsible "designated" person, the LEA Designee must be knowledgeable about the training requirements. The following is a discussion of the training requirements for outside consultants and contractors hired to perform asbestos management and control activities in the schools and for school personnel who work in school building containing asbestos.

1. **Persons who conduct the following activities are required to be accredited in North Carolina:**

   Inspect buildings (inspectors/management planners);
   Write management plans (management planners);
   Design abatement projects (designers);
   Supervise abatement work (contractors/supervisors);
   Perform abatement work (workers); and
   Conduct air monitoring (air monitors and supervising air monitors).

   Only accredited persons may perform the above activities. Each person must complete a training course and pass an examination for the specific discipline in which he/she is seeking accreditation.

   The training course must be one approved by the Environmental Protection Agency (EPA) or an EPA-approved state. An EPA-approved training course is one that meets the requirements of the Model Accreditation Plan outlined in Appendix C to 40 CFR Part 763 Subpart E. A list of approved training providers can be obtained by contacting the Health Hazards Control Unit at (919) 707-5950.

   The NC Department of Health and Human Services, Health Hazards Control Unit (HHCU) issues accreditation to qualified professionals wanting to perform asbestos management activities in North Carolina. The accreditation criteria includes training, education, and asbestos-related experience. Annual reaccreditation is required for all disciplines. Refresher training is required to obtain reaccreditation. A list of qualified professional by discipline can be obtained by calling the HHCU at (919) 707-5950 or on the HHCU website at http://www.epi.state.nc.us/epi/asbestos/accredited.cfm

   Note: We strongly suggest these additional qualifications be considered necessary to perform asbestos services:

   experience in the "asbestos business",
   ability to write clear management plans,
   long term availability to answer questions and do follow-up work,
   knowledge of building design, and
   knowledge of the school system.

2. Training for the LEA Designee

Section 763.84(g) of the AHERA Rule requires that each LEA shall designate a person who is trained to oversee asbestos activities and ensure compliance with the AHERA Rule. It is important that each LEA Designee is trained to properly implement the AHERA program. The Rule does not indicate a specific training course or a required length of training however. It simply specifies the training content. This training shall provide a basic knowledge of :

1) health effects of asbestos exposure;
2) detection, identification and assessment of ACM;
3) options for controlling ACBM;
4) asbestos management programs; and
5) relevant Federal and State regulations.

The LEA designee does not need to be accredited; however, the designee must have the minimal training specified in the Rule. A LEA Designee may opt to complete a 1-2 day course covering the prescribed topics offered or the combined 5-day inspector and management planner course for an in-depth coverage of these topics and more.

3. Awareness Training for Maintenance and Custodial Staff

Section 763.92(a)(1) of the AHERA Rule requires the LEA to ensure that all custodial and maintenance staff (custodians, electricians, heating/air conditioning engineers, plumbers, etc.), who may work in buildings that contain ACBM, receive at least 2 hours awareness training. This training shall be conducted prior to implementing the operations, maintenance and repair provisions of the management plan. New custodial and maintenance employees must be trained within 60 days after being employed.

Training shall cover the following topics:

1) uses and forms of asbestos;
2) health effects of asbestos exposure;
3) locations of ACBM throughout each school building in which they work;
4) recognition of damage, deterioration and delamination of ACBM;
5) name and telephone number of the LEA's Designated Person; and
6) availability and location of the management plan.

A number of training providers are providing the two-hour awareness training. Such training may be available to the public schools through the NC Department of Public Instruction. Two-hour DVD-based awareness training programs are also available from the North Carolina Occupational Safety and Health Education and Resource Center in Chapel Hill at (919) 962-2101.

Note: The OSHA Construction Standard 29 CFR 1926.1101 requires the awareness training to be conducted on an annual basis.

4. Training for Maintenance and Custodial Staff who Conduct Activities that May Disturb ACBM

Section 763.92(a)(2) of the AHERA Rule requires the LEA to ensure provision of 16 hours of Operations and Maintenance (O&M) training to its maintenance and custodial staff who conduct activities which may disturb ACBM. This requirement was effective December 14, 1987.

This training includes the 2-hour awareness training outlined above, plus 14 hours of additional training. The 14 hours of additional training shall include:

1) proper methods of handling ACBM;
2) use of respiratory protection;
3) other personal protection measures:
4) regulations (see 763.92(a)(2)(iii); and
5) Hands-on training in the use of regarding personal protection, other personal protection measures and work practices.

A number of training providers offer O&M training for maintenance and custodial workers. LEA maintenance and custodial staff who have attended EPA-approved asbestos supervisor or worker training courses are considered trained and do not require any additional training. Accreditation for these individuals is <u>not</u> required.

Note: The OSHA Construction Standard 29 CFR 1926.1101 requires annual O&M training.

5. Training of Person(s) to Respond to Problems and/or Questions

Someone from the LEA will need to be able to deal with the media, concerned parents or public, and contractors who are performing or wish to perform asbestos-related services for the LEA. There are no EPA rules or guidelines that discuss training for these persons. Qualifications, education and training will depend upon what activities will be expected by the LEA Superintendent. Training could be obtained by attending one or more of the programs listed above, and also by "becoming involved" in removal projects and response actions performed within the LEA.

PUBLIC RELATIONS AND THE LEA DESIGNEE

While every school district has its share of problems, many can be avoided if the designated person utilizes an effective communications program.

By Kenneth J. Kroski

The combination of public relations and asbestos has, more often than not, resembled that of oil and water. Adding ingredients such as parent concern, litigation requirements and media attention has, ironically, considering the properties and uses of this "wonder" material, created a raging inferno that even asbestos itself probably could not withstand. This delicate mixture is making many local education agency (LEA) designees and school administrators wonder about what public relations activities are necessary as a result of the Asbestos Hazard Emergency Response Act (AHERA) of 1986 and its impact upon financial, logistical and operations and maintenance activities.

Asbestos certainly has the potential for becoming a public relations nightmare. The keys to preventing this quagmire include a comprehensive knowledge of federal and state requirements and the realization of who is affected and to what degree. It is easy to become entangled in the myriad of rules that a school system must enforce, but it is also easy to forget to put yourself in the other person's place. An effective asbestos public relations program necessitates that the LEA utilize a common sense strategy, which causes him or her to think as others will think. Though many believe common sense and asbestos have never personally met, their future relationship will be integral to your continued sanity.

PERCEPTIONS, EMOTIONS AND THE PUBLIC

Webster defines public relations as the methods and activities employed by an individual, organization or government to promote a favorable relationship with the public. These methods can take many forms as can the many constituencies with which a school system works. And when it comes to asbestos, public relations goes far beyond this definition.

Unfortunately, when dealing with asbestos issues, you must deal with perceptions more than reality and emotions more than facts. These reasons make speaking at a Parent-Teacher Association (PTA) meeting or working with the media that much more difficult. A school system's major "asbestos publics" will be parents, co-workers, principals, teachers, the media, maintenance and custodial personnel and even consultants and contractors. Usually, each of these publics views asbestos in a different manner and utilizing and organized method of communication is of utmost importance. It will shape the entire scope and effectiveness of the management plan, as well as affect the timely completion of the related projects. If time permits, detailed memos and attendance at meetings are two ways to ensure understanding and cooperation. However, in order to quell fears at the onset of major problems, it is vital to have good phone skills. Do not assume that people know what you are talking about or that they will accept it. Everyone associated with your

"A true public relations professional researches the audience and the reasons for the speaking requests and approaches such appearances with his or her mindset to make the public comfortable, not vice versa."

facilities will feel AHERA's impact in their own way, whether it is a principal dealing with concerned teachers, maintenance personnel producing blueprints for project design, inspectors gaining entrance to those remote crawl spaces for sampling purposes, or juggling custodial coverage during abatement procedures. Another reason to ensure that employees understand AHERA is building personnel simply need to understand the reason behind forthcoming operations and maintenance programs.

Whether or not your system allows facilities personnel to abate asbestos, continuously required training for facilities personnel such as plumbers, tile persons and custodians should influence their perceptions, as well as their performances. These persons are integral to the continued efficiency of your facilities and may have previously handled asbestos when no one knew better. Do not underestimate their knowledge of the product. Some concerns regarding their health and job responsibilities may surface, and such questions must be anticipated and decisions made prior to the surfacing of these concerns.

The coordination of training courses, particularly if your system is large, may be quite difficult. Acquiring the proper location and notifying all related personnel actually begins with public relations practices. A question often asked by personnel is why must we attend? Be prepared to answer these types of questions from your viewpoint. Using custodial personnel for the six-month periodic surveillance reports will also necessitate delicate public relations maneuvers, especially if your system requires these individuals to perform such work. If those assisting your do not understand the job ahead – the outcome will be negative and disorganized.

Let us not forget the parents and faculties – the groups in which emotions and misperceptions abound. When information is initiated, your written correspondence and verbal presentations must be concise and accurate to the highest degree possible. Often these two publics feel as if their only outlet is the media. Unfortunately, explaining asbestos to members of the media – especially after their opinion has been influenced by an excited caller – is dangerous at best, and subject to misinterpretation. The best advice is to refrain from explaining theory to the media. In most cases, short, precise quotes are your best allies. Remember to answer only the questions asked; confusion will reign without fueling the fire! And, if your school system is involved in litigation, your attorneys may have something to say about your comments to the press if it could affect your lawsuit in any way. This can truly be a catch-22, as are many areas related to asbestos public relations. Also remember that the clarity of your recordkeeping, management plans, operations/maintenance guidelines and surveillance/re-inspection reports will be increasingly important as time progresses.

Organization, honesty and an open-door policy are essential to present professionalism for the LEA designee and the school system. Should the LEA designee or school district lack any one of these three factors, your entire asbestos program could be destroyed. The main ingredient to a professional posture is the individual charged with the related responsibilities – the LEA Designee or asbestos coordinator. If the individual is not believable or not considered knowledgeable, professionalism is lost, as is the issue at hand, whether it is a simple explanation of a recent memo or a potential exposure problem at a school. Once the public views the system's representative as lacking in professionalism, either via phone or personal contact, the mood of the public changes and can provoke hostility or irrational behavior. In order to build as much credibility as possible no matter how talented the designated person may be, the system should place the individual in as many AHERA-related training courses as possible.

Because the AHERA regulations may create more of a need for speaking engagements, polishing related skills is advisable. Appearance, body language and a relaxed, confident speaking style will influence the tone of the event more than many realize. A true public relations professional researches the audience and the reasons for the speaking request and approaches such appearances with his or her mindset to make the public comfortable, not vice-versa. Taking cues from the audience, anticipating questions and the direction of the presentation, as well as being prepared to qualify answers, are skills honed only through exposure to such events.

Many factors are vital to sustaining an effective AHERA public relations program. Each school system is different. What is written and verbalized is up to the individual system or asbestos coordinator. Asbestos-related public relations can backfire in many ways. For this reason, comprehensive, detailed preparation is necessary. While anxieties accelerate relative to funding, staffing, consultant participation, logistics of abatement activities, maintenance management plans, training of personnel and continuity of the program in subsequent years, remember that a well-planned, sincere approach to the issue will truly be worth its weight in gold.

Kenneth J. Kroski is Administrative Assistant, Division of Physical Facilities for the Baltimore County Public Schools

Chapter 4: Management Plans

MANAGEMENT PLANS

Sections:

Management Plan Presentation

Example Management Plan

Blank Management Plan Forms

New Building Management Plan Submittal Guidance and Example Plan

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

AHERA MANAGEMENT PLAN COVER SHEET

LEA: Brooks County School System

State System #: 000

Address: 512 Main Street

Winston, NC 28888

County: Brooks County

Telephone: (919)-555-1212

FICTIONAL EXAMPLE PLAN

Management Plan Submission: Original Resubmittal New Building Reinspection

List of Documents Attached:

School Buildings
Preventive Measures and Response Actions Scheduled
Response Actions Recommended
Operations and Maintenance Plan
Periodic Surveillance Plan
Reinspection Plan
Assessment of Materials
Description of Each Sample Area
Determination of Sampling Locations
Bulk Sample Analysis Form
Resources Needed
Steps to Inform Others
Reinspection Report

LEA AHERA DESIGNEE

Typed Name: John R. Doe

Mailing Address: 1412 Anywhere Street, PO Box 1000

Anywhere, NC 27555

Name of Training Course: LEA AHERA Designee Training

Year 1988 Month 04 Day 05 Total Hours of Course 8

Name of Training Agency: NC Division of Public Health

MANAGEMENT PLANNER

Typed Name: Ronald J. Howell Signature: _____ Date: 03/14/89

NC Accreditation Number: 20070 Agency: Tufts University – Asbestos Information Center

INSPECTOR

Typed Name: Ronald J. Howell Signature: _____ Date: 03/12/89

NC Accreditation Number: 10070 Agency: Tufts University – Asbestos Information Center

For persons who performed inspections, and recommend(ed) design, or carry out response actions (except for operations and maintenance) the local education agency used or will use persons who have been accredited by the State of North Carolina under Article 19, N.C. Gen.Stat. §130A--447 and 10A NCAC 41C .0602(a) of the Asbestos Hazard Management Program Rules. In addition, the LEA has considered whether any conflict of interest may arise from the interrelationship among accredited personnel, such as abatement activities being performed by an inspector or management planner, and whether that should influence the selection of accredited personnel to perform activities under this AHERA Program.

The signatories below certify that the general local education agency responsibilities, as stipulated by Part 763.84 have been met or will be met.

Signature: _____
LEA AHERA Designee

Date: 03/17/89

Signature: _____
LEA Superintendent

Howard J. Easom
Typed Name of Superintendent

Date: 03/17/89

FOR REVIEWING AGENCY USE ONLY

Accepted
Returned for Reasons Stated Below

Reviewer's Signature: _____

Date: _____

DHHS 3531 (Revised 6/03)
Health Hazards Control Unit

PHOTOCOPYING PERMITTED

Instructions for AHERA Management Plan Cover Sheet

Purpose: The LEA (Local Education Agency) shall use this AHERA Management Plan Cover Sheet for any complete or partial submittals of a Management Plan to the Health Hazards Control Unit (HHCU).

Preparation:

1. The LEA should type their name, state system number, address, county and phone number in the top right-hand corner.

2. Place a check mark (✔) to indicate whether this is the original submittal, a resubmittal, a new building or reinspection. Place a check mark (✔) by "New Building," if this is a submittal for a new building that is to be occupied. "New Building" will only be used after an original submittal has been made and when, at a later date, the LEA is acquiring or moving into a new facility.

3. Under List of Documents, make a check mark (✔) to indicate each form that is being submitted with this Management Plan Cover Sheet. All of the indicated documents should be attached to this cover sheet in order for a Management Plan to be considered complete. It would be helpful if they were in the order listed, so they can be easily reviewed.

4. The name and signature of the LEA AHERA designee shall be supplied along with designee's mailing address, telephone number and the name of the training courses taken. For training courses taken by the LEA AHERA designee, the time of those courses shall also be included, such as the year, month, day, total hours of the course and the training agency where the training was received.

5. The Management Planner and Inspector should sign and date the document in the appropriate signature block. The Management Planner and Inspector will also supply the unique accreditation number and the name of the training agency at which training was received.

6. The LEA AHERA Designee should sign and date after reading the above review requirements.

7. The LEA Superintendent should sign and date after reading the above review requirements. Type the name of the Superintendent on the appropriate line.

Distribution: The Cover Sheet and attachments should be mailed to:

NCDHHS/Public Health
Occupational & Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy.

Additional Comments: After the review by the HHCU comments will be sent to the LEA Superintendent.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks Co School System

School: Austin High School

State School System #: 000

FICTIONAL EXAMPLE PLAN

SCHOOL BUILDINGS

Building	Location	Check boxes for the presence of: Friable ACBM	Non-Friable ACBM	Assumed Friable ACBM	Assumed Non-Friable ACBM	No ACBM
1 Main/Admin	Street Address: 512 Main Street City: Winston Zip: 28888	X	X		X	
2. Cafeteria/Gym	Street Address: 512 Main Street City: Winston Zip: 28888	X			X	
3. Mobile Classroom (Serial #12457)	Street Address: 512 Main Street City: Winston Zip: 28888					X
4.	Street Address: 512 Main Street City: Winston Zip: 28888					
5.	Street Address: City: Zip:					
6.	Street Address: City: Zip:					
7.	Street Address: City: Zip:					
8.	Street Address: City: Zip:					
9.	Street Address: City: Zip:					
10.	Street Address: City: Zip:					
11.	Street Address: City: Zip:					
12.	Street Address: City: Zip:					

ACBM = Asbestos Containing Building Material

PHOTOCOPYING PERMITTED

Instructions for School Buildings

Purpose: To record friable and nonfriable material in school buildings according to 40 CFR Part 763.93 (e)(1) of the EPA Asbestos-Containing Materials in Schools, Final Rule and Notice

Preparation: The name of the LEA, school, and school state system number should be in the top right-hand corner of this form.

In each indicated location on the form, list the name and location of each school building. Include street address, city, and zip code. For each building also indicate whether or not asbestos exists in the facility. Under ACBM (asbestos containing building material) indicate presence of friable material or non-friable material. Under Suspect ACBM, indicate presence of friable or non-friable material. If no ACBM or no suspected ACBM has been found in the building by the Inspector, place a check in the column under No ACBM.

Use the same form to list additional buildings.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Occupational & Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, NC 27699-1912

For additional forms, please photocopy.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks Co School System

School: Austin High School

Building: Cafeteria/Gym (02)

FICTIONAL EXAMPLE PLAN

PREVENTIVE MEASURES AND RESPONSE ACTIONS SCHEDULED

Each Location	Description of and Reasons for Preventive Measures and Response Actions	Date Start	Date Complete
Sprayed-on fireproofing (HGA #005) Girls and Boys Locker Rooms	The material located on the beams above the drop ceiling is in good condition except for minor fall out on few tiles in the girls' locker rm. This area above the ceiling will be covered under the O&M program and access is limited to 16 hr trained personnel who will follow proper procedures when working in this area (see O&M Plan Section IV B, C-1). These procedures will protect human health and the environment until removal can be scheduled for the summer of 1989. This is prior to roof replacement. The removal project will be designed by an AHERA accredited designer and conducted by accredited supervisors and workers.	**O&M** Immediate **Removal** 7/89	On-Going 8/89
TSI (HGA #007) Pipe Insulation Crawl Space Under Cafeteria	Due to significantly damaged and deteriorated pipe insulation (steam lines) this area will be isolated. Entry door will be padlocked. Keys to the padlock will be in the possession of the LEA Designee and 16 hr. trained asbestos O&M personnel only. Entry will be restricted to O&M personnel using personal protective equipment and work practices per the O&M Plan will be utilized for work in this area (see O&M Plan). NOTE: All O&M personnel entering this area should avoid physically disturbing asbestos debris in this area. The above action will be used to protect human health and the environment until removal can be conducted by an accredited contractor during the summer of 1989.	**Lock-out** Immediate **O&M** Immediate **Removal** 7/89	On-Going On-Going 8/89
TSI (HGA #008) Boiler/Water Tank Insulation Boiler Room in Cafeteria Bldg	The jacket insulation used in this area is in good condition (new canvas covers). No sign of damage. This material will be covered under the general O&M Plan for thermal system insulation. Refer to plan for any work that might involve disturbing this material. The above response action is sufficient to protect human health and the environment.	**O&M** Immediate	On-Going
TSI (HGA #009) Water Line Insulation (air cell) Elbows/Fittings (HGA #010) Mud insulation on same lines in Cafeteria cleaning supply storage room	There are several areas of minor damage/deterioration to this material. Two damaged elbows and split and exposed jacket on one 3' section of pipe lagging. These areas will be repaired by the schools 16 hr. trained O&M personnel using proper work practices (see O&M Plan). Initial cleaning will be conducted as part of the repairs. The material will be maintained in an undamaged condition using the general O&M Plan. The above response action is sufficient to protect human health and the environment	**Repair** 4/89 **O&M** Immediate	5/89 On-Going

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks Co School System

School: Austin High School

Building: Admin/Main (01)

PREVENTIVE MEASURES AND RESPONSE ACTIONS SCHEDULED

Each Location	Description of and Reasons for Preventive Measures and Response Actions	Date Start	Date Complete
2' x 2' Ceiling Tiles (HGA #001) Offices & Media Ctr	A tile that is water damaged and/or has minor physical damage will be replaced per the specifications in the Operations and Maintenance Plan. The tile will be replaced (with a non-asbestos tile) by school personnel with 16 hrs asbestos O&M training. Initial cleaning will be done as part of repair project. These tiles will be maintained in good condition and will be covered under the general O&M program. The above actions are sufficient to protect human health and the environment until removal (by accredited contractors) can be scheduled.	**Replace** 4/89 **O&M** Immediate **Removal** 6/91	5/89 On-Going 8/91
9" x 9" Brown Floor Tiles (HGA #002) Throughout Entire Building	These tiles are in good condition and will be maintained as such under general O&M plan for non-friable ACM (see O&M Plan). The O&M plan will prevent fiber release if followed properly, thus maintaining a safe environment for the occupants.	**O&M** Immediate	On-Going

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks Co School System

School: Austin High School

Building: Entire Campus – Main (01) and Cafeteria/Gym (02)

PREVENTIVE MEASURES AND RESPONSE ACTIONS SCHEDULED

Each Location	Description of and Reasons for Preventive Measures and Response Actions	Date Start	Date Complete
Misc ACBM assumed Fire Doors (HGA #011) All doors throughout campus	All doors will be assumed to contain asbestos material internally. All doors are in good condition and will be maintained as such. Will be covered under the O&M Plan (see Section IV B, C-3). Any maintenance activity that could disturb the internal material should follow work practices in this plan. NOTE: Before any major renovation or demolition work that would disturb this material is conducted confirmation bulk samples should be taken by an accredited inspector. This response action is sufficient to protect human health and the environment.	O&M Immediate	On-going

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

FICTIONAL EXAMPLE PLAN

LEA: Brooks Co School System

School: Austin High School

Building: Admin/Main (01)

RESPONSE ACTIONS RECOMMENDED

Each Location	Recommended Response Actions	Start Date	Date Complete
2'x 2' Ceiling Tiles (HGA #001) Office and Media Ctr	It is recommended that, at a minimum, the damaged tile be repaired or replaced with a non-asbestos tile and that this area be covered under the O&M Plan. The school system's 16 hr. trained O&M personnel could conduct the repair/replacement of the tile following the guidelines in the O&M Plan. It should be noted that nothing in the AHERA Rules or our recommendations should be construed as to prohibit/discourage removal of this material if the school so chooses. NOTE: Please refer to the Response Action Scheduled for more detail on this homogeneous area.	**Repair/ Replace** 4/89 **O&M** Immediate	5/89 On-Going
9"x 9" Brown Floor Tiles (HGA #002) Throughout entire building	It is recommended that these tiles be covered under the O&M Plan for non-friable ACM (see page 3 of O&M Plan). Please refer to the Response Action Scheduled for details on this homogeneous area.	**O&M** Immediate	On-Going

Management Planner

Typed Name: Ronald J. Howell	Signature:	Date: 03/14/89
Accreditation Number: 20070	Agency: Tufts University – Asbestos Information Center	

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks Co School System

School: Austin High School

Building: Cafeteria/Gym (02)

RESPONSE ACTIONS RECOMMENDED

Each Location	Recommended Response Actions	Start Date	Date Complete
Sprayed-on Fireproofing (HGA #005) Girls & Boys locker rooms (beams above drop ceiling)	It is recommended that, at a minimum, this area be covered under O&M Plan to control access to this material. Only 16 hr. trained O&M personnel following guidelines in the O&M Plan should be allowed to work above this ceiling. It should be noted that nothing in the AHERA Rules or our recommendations should be construed as to prohibit or discourage removal of this material if the school chooses to do so. NOTE: Please refer to the Response Action Scheduled for more details on this homogeneous area	**O&M** Immediate	On-Going
TSI (HGA #007) Pipe Insulation Crawl space under the cafeteria	It is recommended that this area be isolated by padlocking the door immediately because of the significant damage to this material. Also removal should be considered in this area as soon as higher priority areas such as occupied spaces have been taken care of. Due to the extent of damage, until removal can take place, this area should be covered under the O&M Plan and access limited to 16 hr. trained school personnel. NOTE: Please refer to the Response Action Scheduled for more details on this homogeneous area.	**Lock-out** Immediate	Until removal
TSI (HGA #008) Boiler/Water Tank Jacket Insulation Boiler Room in Cafeteria Building	This material is in good condition and it is recommended that, at a minimum, this area be covered under the O&M Plan. Jacket insulation should be maintained in good condition through proper work practices in the O&M Plan. It should be noted that nothing in the AHERA Rules or our recommendations should be construed as to prohibit or discourage removal of this material if the school chooses to do so. NOTE: Please refer to this Response Action Scheduled for more details on this homogeneous area.	**O&M** Immediate	On-Going

Management Planner

Typed Name: Ronald J. Howell	Signature:	Date: 03/14/89
Accreditation Number: 20070	Agency: Tufts University – Asbestos Information Center	

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks Co School System

School: Austin High School

Building: Cafeteria/Gym (02)

RESPONSE ACTIONS RECOMMENDED

Each Location	Recommended Response Actions	Start Date	Date Complete
TSI (HGA #009) Water line insulation (aircell) Elbow/fitting mud insulation (HGA #010) on the same lines as HGA #009 Cafeteria cleaning supply storage room	It is recommended that at a minimum the minor damage/deterioration to this material be repaired. The school's 16 hr. trained O&M personnel could conduct these repairs. Also this area should be covered under the O&M Plan to keep this material in good condition. It should be noted that nothing in the AHERA Rules or our recommendations should be construed as to prohibit or discourage removal if the school chooses to do so. NOTE: Please refer to the Response Action Scheduled for more details on these homogeneous areas.	**Repair** 4/89 **O&M** Immediate	5/89 On-Going

Management Planner

Typed Name: Ronald J. Howell	Signature:	Date: 03/14/89
Accreditation Number: 20070	Agency: Tufts University – Asbestos Information Center	

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks Co School System

School: Austin High School

Building: Main/Admin (01) and Cafeteria/Gym (02)

RESPONSE ACTIONS RECOMMENDED

Each Location	Recommended Response Actions	Start Date	Date Complete
Misc. ACBM – assumed (HGA #011) Fire Doors	It is recommended that all doors be considered to contain asbestos material internally and covered under the O&M Plan. NOTE: Please refer to the Response Action Scheduled for more details on this homogeneous area.	**O&M** Immediate	On-Going

Management Planner

Typed Name: Ronald J. Howell	Signature:	Date: 03/14/89
Accreditation Number: 20070	Agency: Tufts University – Asbestos Information Center	

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL BRANCH
HEALTH HAZARDS CONTROL UNIT

FICTIONAL EXAMPLE PLAN

LEA: Brooks Co School System

School: Austin High School

Building: Admin/Main (01) & Cafeteria/Gym (02)

OPERATIONS AND MAINTENANCE PLAN

DISCUSSION OF OPERATIONS, MAINTENANCE AND REPAIR PLAN

HOMOGENEOUS AREA:

Admin/Main Building (01)

(HGA #001) 2'x 2' Ceiling Tiles (Lay in)
Follow O&M Plan Sections IV A, B, C.3.
(HGA #002) 9" x 9" Brown Floor Tiles
Follow O&M Plan Section IV C.3.b

Cafeteria/Gymnasium (02)

(HGA #005) Sprayed-on fire proofing
Follow O&M Plan Sections IV A, B, C.1.
(HGA #007) Pipe Insulation (Crawl space)
Follow O&M Plan Section IV B, C.2.
(HGA #008) Boiler and Water Tank Jacket Insulation
Follow O&M Plan Sections IV B, C.2.
(HGA #009) Water Line Insulation (Air Cell)
Follow O&M Plan Sections IV A, B, C.2.
(HGA #010) Water Line (Elbow/Fitting) Insulation
Follow O&M Plan Sections IV A, B, C.2.

Both Buildings

(HGA #001) Fire Doors (Internal Asbestos Material)
Follow O&M Plan Section IV B, C.3.c

In addition to the specific area referenced above, all O&M activities should follow the general O&M plan

PHOTOCOPYING PERMITTED

LEA: Brooks Co School System

School: Austin High School

Building: Admin/Main (01) & Cafeteria/Gym (02)

OPERATIONS AND MAINTENANCE PLAN

DISCUSSION OF OPERATIONS, MAINTENANCE AND REPAIR PLAN

HOMOGENEOUS AREA:

Purpose:

This Operations and Maintenance (O&M) program is designed to minimize or eliminate the exposure of building occupants and maintenance staff to asbestos fibers from asbestos containing building materials in these buildings. This will be accomplished through the use of special work practices and procedures.

I. Operations and Maintenance Activities Categories:

A. Small-Scale, Short Duration Activities

Appendix B to Subpart E 763 AHERA Regulations define these activities as, but not limited to:

1. Removal of asbestos-containing insulation on pipes.
2. Removal of small quantities of asbestos-containing insulation on beams or above ceilings.
3. Replacement of an asbestos-containing gasket on a valve.
4. Installation or removal of a small section of drywall.
5. Installation of electrical conduits through or proximate to asbestos-containing materials.

Small-scale, short-duration maintenance activities can be further defined for the purposes of this management plan by the following considerations:

1. Removal of small quantities of asbestos-containing materials (ACM) only if required in the performance of another maintenance activity not intended as asbestos abatement
2. Removal of asbestos-containing thermal system insulation not to exceed amounts greater than those which can be contained in a single glove bag.
3. Minor repairs to damaged thermal system insulation which do not require removal.
4. Repairs to a piece of asbestos-containing wallboard.
5. Repairs, involving encapsulation, enclosure or removal, to small amounts of friable asbestos-containing material only if required in the performance of emergency or routine maintenance activity and not intended solely as asbestos abatement. Such work may not exceed amounts greater than those which can be contained in a single prefabricated mini-enclosure. Such an enclosure shall conform spatially and geometrically to the localized work area, in order to perform its intended containment function.

PHOTOCOPYING PERMITTED

LEA: Brooks Co School System

School: Austin High School

Building: Admin/Main (01) & Cafeteria/Gym (02)

OPERATIONS AND MAINTENANCE PLAN

DISCUSSION OF OPERATIONS, MAINTENANCE AND REPAIR PLAN

HOMOGENEOUS AREA:

B. Maintenance Activities Other Than Small-Scale, Short-Duration (Major O&M) – Any maintenance activities that do not fit the small-scale categories are considered major and shall be designed and conducted by accredited personnel.

II. Training Categories

A. All custodial and maintenance staff that work at this facility shall receive at least two (2) hours of awareness training in accordance with 40 CFR 763.92(a).

NOTE: This training does not qualify these individuals to disturb asbestos containing building materials (ACBM) in any sense.

B. All operations and maintenance staff (custodians, plumbers, etc.) that may disturb ACBM under small-scale, short-duration projects (see I.A above) shall receive in addition to the two (2) hour awareness training an additional fourteen (14) hours of O&M training in accordance with 40 CFR 763.92(a)2. These will be school maintenance employees such as carpenters, plumbers, electricians, and few custodians.

III. Worker Protection

A. Respiratory Protection – As part of the O&M Program a written respiratory protection program shall be developed to protect all O&M employees who may disturb ACBM. This program shall be developed in accordance with EPA/NIOSH (Guidance Document) guide to Respiratory Protection for the Asbestos Abatement Industry (EPA 560/OPTS-86-001) and the OSHA Regulations 1926.58 and 1910.134. It shall cover, but not limited to such areas as Medical Evaluation, Fit Testing and Respirator selections.

NOTE: For most small-scale, short-duration O&M activities, a ½ face air purifying respirator with replacement HEPA Filters will provide adequate protection. See respiratory protection program for additional protection.

B. Personal Protection Equipment – O&M personnel involved in activities that disturb ACBM shall wear disposable coveralls with disposable head and shoe covers and gloves during these activities.

PHOTOCOPYING PERMITTED

LEA: Brooks Co School System

School: Austin High School

Building: Admin/Main (01) & Cafeteria/Gym (02)

OPERATIONS AND MAINTENANCE PLAN

DISCUSSION OF OPERATIONS, MAINTENANCE AND REPAIR PLAN

HOMOGENEOUS AREA:

IV. Work Procedures for ACM (Asbestos-Containing Material) Areas

A. Initial Cleaning – Unless the homogeneous areas have been cleaned using equivalent methods within the previous 6 months, all areas of friable ACBM or damaged thermal system insulation shall be cleaned at least once after the completion of the inspection process and before the initiation of any response actions, other than O&M activities or repair, according to the following procedures:

1. HEPA vacuum or steam clean all carpets.
2. HEAP vacuum or wet clean all other floors and all other horizontal surfaces.
3. Dispose of all debris, filters, mopheads, and clothes in sealed leakproof containers.

NOTE: This initial cleaning can be done as part of the O&M repair projects.

B. Standard Operating Procedures for O&M Activities

1. Before any O&M activity (small-scale and major) can begin that may disturb ACBM, written authorization from the asbestos program manager must be obtained.
2. All O&M activity areas shall be restricted (isolated) to the appropriate O&M personnel (16 hour trained) who are conducting these activities.
3. Signs will be posted to prevent entry into these areas.
4. The HVAC system will be shut off or modified if needed to restrict air flow movement.
5. Remove any objects from the work area that may be contaminated during maintenance activity. Any fixed objects shall be completely covered with 6-mil thick polyethylene plastic. Any object already contaminated shall be thoroughly HEPA vacuumed or wet wiped before moving or encasing with plastic.
6. All O&M employees shall use appropriate worker protection.
    a. full body coveralls with hood (i.e. tyvek)
    b. respiratory protection – for glove bagging and minor repairs: ½ face piece negative air purifying respirator with HEPA cartridges may be used. For additional protection requirements refer to written respiratory program.
7. Appropriate work practice such as glove bagging, wet methods, HEPA vacuum, etc. (see Appendix B 763 AHERA) shall be used to control fiber release during maintenance activities. See appropriate section for details on each type of material (surfacing, etc.)

PHOTOCOPYING PERMITTED

LEA: Brooks Co School System

School: Austin High School

Building: Admin/Main (01) & Cafeteria/Gym (02)

OPERATIONS AND MAINTENANCE PLAN

DISCUSSION OF OPERATIONS, MAINTENANCE AND REPAIR PLAN

HOMOGENEOUS AREA:

8. Disposal of ACM
    a. Double bag (6-mil) using a properly labeled asbestos disposal bag.
       NOTE: In situations where the waste will not fit into these bags it will be permitted to wrap this material in 6-mil plastic for disposal.
    b. Always make sure bagged material is thoroughly wet.
    c. Stored bags or materials shall be stored under lock and key. Bagged material should be placed in 55-gallon drums and sealed.
    d. All containers (bags/drums/wrapped) shall be labeled as follows:
       DANGER: CONTAINS ASBESTOS FIBERS –
       AVOID CREATING DUST; CANCER AND LUNG DISEASE HAZARD
    e. Transport asbestos waste in enclosed trucks.
    f. Dispose of asbestos waste in approved landfill. (Please contact landfill prior to arrival to confirm acceptance.)
    g. Maintain asbestos chain of custody forms for stored or disposed waste material.

C. Specific Work Practices for ACM
    1. Surfacing Materials
        a. Follow all procedures under Standard operating procedures IV B.
        b. A 6-mil polyethylene plastic drop cloth should be placed beneath the location of the maintenance work, extending at least 10 feet beyond all sides of the work area.
        c. The ACM in the vicinity of the maintenance work should be misted lightly with amended water (a combination of surfactant and water) using a very fine mist. Be sure electrical system is shut off if working around fixtures.
        d. Use the HEPA vacuum or wet method to remove any large dangling pieces of ACM. Then repair the area using non-asbestos spackling or other appropriate materials. Do not attempt repairs to sprayed-on fire proofing.
        e. A bridging encapsulant may be used to seal the area after repairs.
        f. After the repair work is completed all tools, ladders, and equipment should be HEPA vacuumed or wet wiped.
        g. Any debris on drop cloth, floor, or elsewhere should be HEPA vacuumed or wet wiped.
        h. The plastic drop cloth should then be misted and then carefully folded in on itself, and discarded as asbestos waste. NOTE: Follow waste disposal guidelines under IV B.8 of O&M Plan.

PHOTOCOPYING PERMITTED

DISCUSSION OF OPERATIONS, MAINTENANCE AND REPAIR PLAN

HOMOGENEOUS AREA:

i. The worker shall then HEPA- vacuum respirators and protective clothing at the work site. Disposable clothing should then be discarded as asbestos waste. NOTE: If the ACM was disturbed during the course of the work, the worker should then leave respirator on and proceed to a shower, shower with the respirator on, and clean the respirator well in the shower before removing.

* Also workers in these situations should wear only washable nylon swim trunks or other comparable items under their disposable clothing. This is to avoid contaminating work clothes.

2. Thermal System Insulation
   a. Follow all procedures under the Standard Operating Section IV B of O&M Plan.
   b. (i) If thermal system insulation needs to be removed as part of the maintenance project, standard glove bag technique should be used (see attached Appendix B for details).

      (ii) For minor repairs see Steps for Minor Repairs to Insulation and Lagging in Appendix A of this O&M Plan.

      (iii) For removal of entire asbestos insulation structures (pipes, etc.) see Appendix B of Subpart E 763 attached to O&M Plan.
   c. Follow steps f, g, h, and i for surfacing material for cleaning up after these projects.
3. Miscellaneous Materials
   a. Ceiling Tiles: follow same procedures for surfacing materials (c.1). Lay in tiles should be replaced with non-asbestos containing ones instead of repairing.
   c. Non-friable Materials (floor tiles, transite board, etc.): follow all procedures under the Standard Operating Section IV B of O&M Plan for projects that involve the removal of these materials.

      No activities or equipment are to be used on these materials that could cause fiber release such as drilling, sawing, sanding, or cutting with power tools. If this non-friable ACM must be disturbed the following precautions should be taken:

      Wet material with fine mist of water

      Equip power tools with HEPA vacuum/filter systems

      Remove material intact (whole tiles, sheets, etc.)

      Avoid breaking or dropping of material

PHOTOCOPYING PERMITTED

LEA: Brooks Co School System

School: Austin High School

Building: Admin/Main (01) & Cafeteria/Gym (02)

OPERATIONS AND MAINTENANCE PLAN

DISCUSSION OF OPERATIONS, MAINTENANCE AND REPAIR PLAN

HOMOGENEOUS AREA:

NOTE: Floor tiles – maintain a good coat of wax on floors. Avoid creating dust when buffing floors. Use soft pads at slow speeds when practical. Use wet methods

c. Fire Doors – Avoid drilling, sawing, or any other activity that may disturb internal asbestos material. Follow the procedures under surfacing material (C.1) if work must be done on doors that would disturb this material.

V. Fiber Release Episodes (EPA definition: any uncontrolled or unintentional disturbance of ACBM resulting in visible emissions)

1. Minor: (The falling or dislodging of 3 square or linear feet or less of ACBM). In addition to the following the guidelines for small-scale, short-duration O&M activities the following procedures shall be implemented.
   a. wet debris and clean area using HEPA vacuum and/or wet method.
   b. repair damaged or exposed area with asbestos free materials or immediately have the appropriate response action conducted.
2. Major: (The falling or dislodging of more than 3 square or linear feet of ACBM). The following procedures shall be implemented:
   a. restrict entry and post signs.
   b. shut off or temporarily modify HVAC system if needed to prevent fiber distribution.
   c. contact an outside accredited contractor(s) for design and implementation of the appropriate response action. NOTE: All fiber release episodes shall be reported to the asbestos program manager immediately.

VI. Air Monitoring

1. Personal Air Samples – as required by the OSHA standard 29 CFR 1926.58, initial air samples shall be collected for all types of maintenance activities that would disturb ACBM. This is to establish exposure levels for these activities. This sampling should be conducted by a CIH (Certified Industrial Hygienist) or a technician under his/her directions. NOTE: This sampling should be done initially for each type of O&M procedures (glove bag, etc.) and repeated periodically to verify good work practices for O&M activities.

PHOTOCOPYING PERMITTED

LEA: Brooks Co School System

School: Austin High School

Building: Admin/Main (01) & Cafeteria/Gym (02)

OPERATIONS AND MAINTENANCE PLAN

DISCUSSION OF OPERATIONS, MAINTENANCE AND REPAIR PLAN

HOMOGENEOUS AREA:

2. Area Air Samples – are required under 763.90(2)(i) for clearance after removal, encapsulation, and enclosure project involving ACBM, except for small-scale, short-duration projects.

   NOTE: Also area air monitoring may be used as a supplement to your periodic surveillance program.

VII. Recordkeeping

1. All recordkeeping requirements of 40 CFR 763.94 shall be maintained in the administrative office of the school and the local education agency as part of the management plan. These include O&M records such as training certificates, initial periodic cleaning, O&M activities (small-scale, larger projects and major asbestos), work authorization forms, and respiratory protection program (medical evaluations and fit testing). Also records on preventive measures and release articles, short term workers, release forms, and periodic surveillance shall be maintained as part of the plan. The asbestos program manager shall be responsible for these and all activities in keeping the management plan updated.

Note: Refer to Appendix B 763 AHERA for a list of Prohibited Activities.

PHOTOCOPYING PERMITTED

APPENDIX A
STEPS FOR MINOR REPAIRS TO INSULATION AND LAGGING

1. All repair workers will wear at a minimum: 1/2 face piece negative air purifying respirator with HEPA cartridges and full body with hood coveralls.

2. Piping: Remove any loose material with HEPA vacuum. No existing jacket material is to be removed.

   Fill holes with mineral wool insulating cement and cover damaged areas with non-woven fibrous glass mat completely saturated with bridging type encapsulant. Wrap open joints with non-woven fibrous glass mat embedded in bridging type encapsulant. Smooth mat to a wrinkle free condition. Allow to dry and coat entire surface of mat with an additional coat of bridging type encapsulant and brush to a smooth uniform appearance.

3. Fittings: Patch damaged fittings as required, using mineral wool insulating cement. Smooth insulation to a uniform appearance, continuous with and not overlapping adjacent straight insulation runs. Cover entire surface of fitting with non-woven fibrous glass mat embedded in bridging type encapsulant. Stretch to conform to shape of fitting and smooth to a uniform appearance without wrinkles. Overlap jackets of adjacent straight insulations sections by 3". Allow to dry and coat entire surface of mat with bridging type encapsulant and brush to a smooth finished appearance.

4. Equipment Lagging: (Hot water tanks, converters, etc.) Fill damaged portion or lagging as required with mineral wool insulating cement and cover with non-woven fibrous glass mat completely embedded in bridging type encapsulant. Coat area of repair and six inches on all sides with bridging type encapsulant, brush out to a uniform appearance. Completely coat laggings which do not possess a canvas jacket with two coats of bridging type encapsulant.

5. Boiler and Smoke Hoods Breaching Laggings: Fill damaged portions of laggings, as required, with mineral wool insulating cement. Coat entire surface of lagging with ¼" minimum thickness of mineral wool insulating cement reinforced with open weave glass fiber mat. Trowel surface smooth finish.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks County School System

FICTIONAL EXAMPLE PLAN

School: Austin High School

Building: Admin/Main (01) & Café/Gym (02)

PERIODIC SURVEILLANCE PLAN

DISCUSSION OF PERIODIC SURVEILLANCE PLAN

As required by 40 CFR 763.92(b) at least once every 6 months after this management plan is in effect a qualified member of the school staff will conduct periodic surveillance in each building that has been found or assumed to contain ACBM. The first periodic surveillance shall be on or before October 1, 1989. (Please refer to the "Response Actions Scheduled" form for homogeneous area.)

These person(s) shall:

1. Visually inspect all areas that have been identified in the management plan as containing ACBM or assumed to contain ACBM.
2. Complete a surveillance report which shall include their name, date, and any changes in the condition of the materials. These changes could be, but not limited to, torn pipe insulation, water stains, or any signs of physical damage.
3. Submit this report to the asbestos program manager who will be responsible for including it into the management plan; evaluation of the report results, and implementation of any response action required by changes in the condition of the ACBM.

PHOTOCOPYING PERMITTED

Instructions for Periodic Surveillance Plan

Purpose: To provide a periodic surveillance plan as required by 40CFR Part 763.93(e)(9) of the EPA Asbestos Containing Materials in Schools; Final Rule and Notice.

Preparation: Enter the name of the LEA, the school, and the building in the top right-hand corner.

Discuss the Periodic Surveillance Plan described in paragraph 763.92(b) requiring a periodic surveillance of each building with ACBM at least every 6 months. Each person performing periodic surveillance shall visually inspect the areas, record the date, area of inspection, inspector's name, and description of any changes of the materials. A copy shall be included in the management plan and submitted to the LEA Designee.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Occupational & Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy.

LE

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks County School System

FICTIONAL EXAMPLE PLAN

School: Austin High School

Building: Admin/Main (01)

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA (S): 9"x 9" Brown Floor Tiles (HGA #002)

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
(HGA #002)					Locations: Throughout
002 – 445	Chrys	2%	None	(5) ACBM with potential	entire building – class
002 -- 446	Chrys	2%	None	for damage	rooms, hallways (ceramic
					tiles in restrooms)
					Quantity: Approximately
					20,000 square feet.
					Damage: No damaged tile
					observed.
					Potential for disturbance
					low, non-friable material.
					See O&M Plan for work
					Practices.

Inspector

Typed Name: Ronald J. Howell	Signature:	Date: 3/14/89
Accreditation Number: 10096	Agency: Tufts University – Asbestos Information Center	

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks County School System

School: Austin High School

Building: Caféteria/Gym (02)

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA (S): TSI – Pipe Insulation (lagging) water lines (HGA #009)
TSI – Elbow/Fitting same lines (HGA #010)

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
(HGA #009)					Locations: This material
Aircell -- assumed			None	(1) Damaged Thermal	Located on the water lines
				System Insulation	in cafeteria cleaning
					supply room.
(HGA #010)					Quantity: Approximately
110 – 106	Chrys	30%	None	(1) Damaged Thermal	50 linear feet & 10 elbow
	Amosite	10%	None	System Insulation	fittings
110 -- 107	Chrys	20%	None		Damage: 2 elbows with
	Amosite	10%	None		exposed material and one
					3’ section of pipe
					insulation that is split
					open, apparently caused
					by deterioration. Potential
					for damage.
					Frequency Contact: Low.
					Vibrations: None.
					Air Erosion: None.

Inspector

Typed Name: Ronald J. Howell	Signature:	Date: 03/14/89
Accreditation Number: 10096	Agency: Tufts University – Asbestos Information Center	

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks County School System

School: Austin High School

Building: Entire Campus (Both Buildings)

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA (S): Miscellaneous ACBM – Fire Door (Internal material; HGA #011)

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
(HGA #011)					Locations: For O&M
Assumed			none	(5) ACBM with the	purposes all doors other
				potential for damage	than glass should be
					considered to contain
					ACM.
					Quantity: Approx. 20 doors
					Damage: No damage observed
					Potential for Disturbance:
					Frequency of contact low
					during maintenance
					Vibrations: none
					Air Erosion: none

Inspector

Typed Name: Ronald J. Howell	Signature:	Date: 03/14/89
Accreditation Number: 10096	Agency: Tufts University – Asbestos Information Center	

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks County School System

School: Austin High School

Building: Cafeteria/Gym (02)

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA (S): TSI – Boiler/Water Tank Insulation (HGA #008)

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
(HGA #008)					Locations: Boiler Room
008 – 103	Chrys	30%	none	(7) Friable ACBM	jackets insulation on both
	Amosite	10%			units.
008 – 104	Chrys	30%	none	(5) ACBM with potential	Quantity: Approximately
	Amosite	10%		for damage	400 square feet total both
008 – 105	Chrys	30%	none		units.
	Amosite	10%			Damage: no damage observed
					(new jackets 1986)
					Potential for disturbance
					Frequency of Contact: Low
					during infrequent
					maintenance activity
					Vibrations: None
					Air Erosion: None

Inspector

Typed Name: Ronald J. Howell	Signature:	Date: 03/14/89
Accreditation Number: 10096	Agency: Tufts University – Asbestos Information Center	

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks County School System

School: Austin High School

Building: Admin/Main (01)

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA (S): 2' x 2' Ceiling Tiles (HGA #001)

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
(HGA #001)					
001 – 335	Chrys	10%	none	(4) Damaged friable	Locations: Principals'
001 – 336	Chrys	15%	none	miscellaneous ACM	offices and media center.
001 – 337	Chrys	0%	none		Quantity: Approximately
					10,000 square feet.
					Damage: One tile with
					water damage and/or minor
					physical damage.
					This was apparently caused
					by roof leak which has been
					repaired.
					Potential for Disturbance:
					Frequency of Contact: Low
					Vibration: None
					Air Plenum/Erosion: None

Inspector

Typed Name: Ronald J. Howell	Signature:	Date: 03/14/89
Accreditation Number: 10096	Agency: Tufts University – Asbestos Information Center	

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks County School System

School: Austin High School

Building: Cafeteria/Gym (02)

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA (S): TSI – Pipe Insulation – Crawl Space (HGA #007)

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
(HGA #007)					
007 – 100	Chrys	30%	none	(1) Significantly damaged	Locations: This material is
007 – 101	Chrys	20%	none	thermal system	located in the crawlspace under
007 – 102	Chrys	35%	none	insulation	under the cafeteria.
					Quantity: Approx 300 lf
					Damage: Approx 50% of the
					material has physical damage
					(torn cover and exposed material)
					Also there are several locations
					where this material has fallen off
					the pipes onto the ground,
					apparently caused by deterioration
					and maintenance activity.
					Potential for Disturbance:
					Frequency of Contact: Low
					Vibrations: None
					Air Plenum/Erosion: None

Inspector

Typed Name: Ronald J. Howell	Signature:	Date: 03/14/89
Accreditation Number: 10096	Agency: Tufts University – Asbestos Information Center	

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: Brooks County School System

School: Austin High School

Building: Cafeteria/Gym (02)

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA (S): Sprayed-on fireproofing (surfacing) (HGA #005)

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
(HGA #005)					Locations: This material is
005 – 122	Amosite	10%	none	(2) Damaged friable	sprayed on the beams above
005 -- 123	Amosite	15%	none	surfacing ACM	drop ceiling in girls and boys
0550--124	Amosite	20%	none		locker rooms.
					Quantity: Approximately
					1,000 square feet
					Damage: Minor localized
					fall out on top surface of
					ceiling. Apparently caused by
					telephone maintenance work.
					Potential for Disturbance
					Frequency of Contact: Low
					Virbrations: None
					Air plenum/Erosion: None

Inspector

Typed Name: Ronald J. Howell	Signature:	Date: 03/14/89
Accreditation Number: 10096	Agency: Tufts University – Asbestos Information Center	

PHOTOCOPYING PERMITTED

Instructions for Assessment of Materials

Purpose: The information required by this form is referenced in 40CFR Part 763.93(e)(3)(v) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: At the right-hand corner fill in the name of the LEA, the school and the building.

As described in 763.88(a), (b), and (c), for each homogeneous area where ACBM is found or suspected, the inspector shall classify and assess the materials. A classification and assessment shall be made for each homogeneous area. Use a separate page for each homogenous area. Do not crowd the information.

Under "Sample ID," each sample in a homogeneous area shall be identified by the number assigned by the inspector or the owner.

Under "Asbestos," when the sample has been found to contain more than 1% asbestos, the type of asbestos and the percent of asbestos will be indicated.

Under "Photo", a reference will be made to indicate the unique number assigned to any photograph taken to be used in this report or in the future.

Under "Assessment," the inspector shall classify the ACBM as required in paragraph 763.88(b), into one of the following categories: 1) damaged or significantly damaged thermal insulation ACM; 2) damaged friable surfacing ACM; 3) significantly damaged friable surfacing ACM; 4) damaged or significantly damaged friable miscellaneous ACM; 5) ACBM with potential for damage; 6) ACBM with potential for significant damage; 7) any remaining friable ACBM or friable suspected ACBM.

Under "Comments," the inspector shall include information such as location, the amount of material, the condition of the material, type of damage or significant damage, severity of damage, extent for spread of damage, accessibility, potential for disturbance, known or suspected causes of damage, preventive measures which might reduce or eliminate fiber disturbance, and/or other comments and recommendations appropriate to the conditions observed.

At the bottom of this form, the inspector shall include the typed name, signature, date of signature, unique accreditation number and the name of the training agency at which training was obtained.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Occupational & Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

AHERA MANAGEMENT PLAN COVER SHEET

LEA:_____

State System #:_____

Address:_____

_____

County:_____

Telephone:_____

Management Plan Submission: ❑ Original ❑ Resubmittal ❑ New Building ❑ Reinspection

List of Documents Attached:

- ❑ School Buildings
- ❑ Preventive Measures and Response Actions Scheduled
- ❑ Response Actions Recommended
- ❑ Operations and Maintenance Plan
- ❑ Periodic Surveillance Plan
- ❑ Reinspection Plan
- ❑ Assessment of Materials
- ❑ Description of Each Sample Area
- ❑ Determination of Sampling Locations
- ❑ Bulk Sample Analysis Form
- ❑ Resources Needed
- ❑ Steps to Inform Others
- ❑ Reinspection Report

LEA AHERA DESIGNEE

Typed Name:_____ Name of Training Course:_____

Mailing Address:_____ Year_____ Month_____ Day_____ Total Hours of Course_____

_____ Name of Training Agency:_____

MANAGEMENT PLANNER

Typed Name:_____ Signature:_____ Date:_____

NC Accreditation Number:_____ Agency:_____

INSPECTOR

Typed Name:_____ Signature:_____ Date:_____

NC Accreditation Number:_____ Agency:_____

For persons who performed inspections, and recommend(ed) design, or carry out response actions (except for operations and maintenance) the local education agency used or will use persons who have been accredited by the State of North Carolina under Article 19, G.S. 130A-447 and 15A NCAC 19C .0602(a) of the Asbestos Hazard Management Program Rules. In addition, the LEA has considered whether any conflict of interest may arise from the interrelationship among accredited personnel, such as abatement activities being performed by an inspector or management planner, and whether that should influence the selection of accredited personnel to perform activities under this AHERA Program.

The signatories below certify that the general local education agency responsibilities, as stipulated by Part 763.84 have been met or will be met.

Signature:_____
LEA AHERA Designee

Date:_____

Signature:_____
LEA Superintendent

_____
Typed Name of Superintendent

Date:_____

FOR REVIEWING AGENCY USE ONLY

❑ Accepted
❑ Returned for Reasons Stated Below

Reviewer's Signature:_____

Date:_____

DHHS 3531 (Revised 7/99)
Health Hazards Control Unit

PHOTOCOPYING PERMITTED

Instructions for AHERA Management Plan Cover Sheet

Purpose: The LEA (Local Education Agency) shall use this AHERA Management Plan Cover Sheet for any complete or partial submittals of a Management Plan to the Health Hazards Control Unit (HHCU).

Preparation:

1. The LEA should type their name, state system number, address, county and phone number in the top right-hand corner.

2. Place a check mark ( ) to indicate whether this is the original submittal, a resubmittal, a new building or reinspection. Place a check mark ( ) by "new building" if this is a submittal for a new building that is to be occupied. "New Building" will only be used after an original submittal has been made and when, at a later date, the LEA is acquiring or moving into a new facility.

3. Under List of Documents, make a check mark ( ) to indicate each form that is being submitted with this Management Plan Cover Sheet. All of the indicated documents should be attached to this cover sheet in order for a Management Plan to be considered complete. It would be helpful if they were in the order listed, so they can be easily reviewed.

4. The name and signature of the LEA AHERA designee shall be supplied along with designee's mailing address, telephone number and the name of the training courses taken. For training courses taken by the LEA AHERA designee, the time of those courses shall also be included, such as the year, month, day, total hours of the course and the training agency where the training was received.

5. The Management Planner and Inspector should sign and date the document in the appropriate signature block. The Management Planner and Inspector will also supply the unique accreditation number and the name of the training agency at which training was received.

6. The LEA AHERA Designee should sign and date after reading the above review requirements.

7. The LEA Superintendent should sign and date after reading the above review requirements. Type the name of the Superintendent on the appropriate line.

Distribution: The Cover Sheet and attachments should be mailed to:

NCDHHS/Public Health
Occupational & Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy.

Additional Comments: After the review by the HHCU comments will be sent to the LEA Superintendent.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: _____

School: _____

State School System #: _____

SCHOOL BUILDINGS

Check boxes for the presence of:

Building	Location	Friable ACBM	Non-Friable ACBM	Assumed Friable ACBM	Assumed Non-Friable ACBM	No ACBM
1	Street Address: City: Zip:					
2.	Street Address: City: Zip:					
3.	Street Address: City: Zip:					
4.	Street Address: City: Zip:					
5.	Street Address: City: Zip:					
6.	Street Address: City: Zip:					
7.	Street Address: City: Zip:					
8.	Street Address: City: Zip:					
9.	Street Address: City: Zip:					
10.	Street Address: City: Zip:					
11.	Street Address: City: Zip:					
12.	Street Address: City: Zip:					

ACBM = Asbestos Containing Building Material

PHOTOCOPYING PERMITTED

Instructions for School Buildings

Purpose: To record friable and nonfriable material in school buildings according to 40 CFR Part 763.93 (e)(1) of the EPA Asbestos-Containing Materials in Schools, Final Rule and Notice

Preparation: The name of the LEA, school, and school state system number should be in the top right-hand corner of this form.

In each indicated location on the form, list the name and location of each school building. Include street address, city, and zip code. For each building also indicate whether or not asbestos exists in the facility. If no ACBM or no suspected ACBM has been found in the building by the Inspector, place a check in the column under No ACBM.

Use the same form to list additional buildings.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Occupational & Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, NC 27699-1912

For additional forms, please photocopy.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: _____

School: _____

Building: _____

PREVENTATIVE MEASURES AND RESPONSE ACTIONS SCHEDULED

Each Location	Description of and Reasons for Preventive Measures and Response Actions	Date Start	Date Complete

PHOTOCOPYING PERMITTED

Instructions for Preventative Measures and Response Actions Scheduled

Purpose: To record preventive measures and response actions scheduled as required by 40 CFR Part 763.93 (e)(6) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: In the top right-hand corner of the form, fill in the name of the LEA, the school name, and the building name.

Under the column entitled, "Each Location," the LEA shall indicate a description of each homogeneous area where friable asbestos containing material (ACBM) was found in the building.

For each location where friable ACBM is found in the building, the LEA shall give a detailed description of preventive measures and response actions to be taken and the reasons for selecting the response action or preventive measure.

For each action to be taken, the LEA shall indicate the month, day and year the action is to begin and also the month, day and year the action is scheduled to be completed.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Occupational & Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: _____

School: _____

Building: _____

RESPONSE ACTIONS RECOMMENDED

Each Location	Recommended Response Actions	Start Date	Date Complete

Management Planner

Typed Name:	Signature:	Date:
Accreditation Number:	Agency:	

PHOTOCOPYING PERMITTED

Instructions for Response Actions Recommended

Purpose: To record response actions recommended as required by 40 CFR 763.93 (e)(5) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice by the Accredited Management Planner.

Preparation: The name of the LEA, the school, and the building shall be entered in the top right-hand corner of this form.

Under the column “Each Location" in line with 763.88 (d), the Management Planner shall describe the homogeneous area where a response action is recommended.

The Management Planner shall describe recommended response actions for each homogeneous area under RECOMMENDED RESPONSE ACTIONS.

A schedule for each response action recommended for each location shall include the month, day and year for when the response actions should begin and the month, day, and year when the response actions should be completed.

The Management Planner should sign and date the document in the appropriate signature block. The Management Planner will also supply the unique accreditation number and the name of the training agency at which the training was received.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Occupational & Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: _____

School: _____

Building: _____

DETERMINATION OF SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA

Inspector

Typed Name:	Signature:	Date:
Accreditation Number:	Agency:	

PHOTOCOPYING PERMITTED

Instructions for Determination of Sampling Locations

Purpose: To provide a description of the manner used to determine sampling locations as described in 40 CFR Part 763.93 (e)(3)(iii) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: Enter the name of the LEA, the school, and the building in the top right-hand corner.

Discuss the manner used to determine a homogeneous area and how to select the sample location within each homogeneous area.

At the bottom of this form, the inspector shall supply their name, signature, date of signature, unique accreditation number and the training agency where training was obtained.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Occupational & Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy.

LEA: _____

School: _____

Building: _____

Sample Date: _____

Analysis Date: _____

Analysis Method: _____

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): _____

_____

Owner Sample ID	Lab Sample ID	Asbestos Type	Asbestos %	**Comments**

It is certified by the signature below that the laboratory identified below is accredited by the National Institute of Standards/Technology for polarized light microscope (PLM) analysis under the National Voluntary Laboratory Accreditation Program.

Laboratory:	Address:
NVLAP Laboratory #:	

Analysis Performed By:

Typed Name:	Signature:	Date:

PHOTOCOPYING PERMITTED

Instructions for Bulk Sample Analysis

Purpose: To provide a copy of analyses of bulk samples collected and analyzed as described in 40 CFR Part 763.93 (e)(3)(iv) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: In the top right-hand corner of this form, enter the name of the LEA, the school name, the building name, the date the sample(s) were taken, the date the sample(s) were analyzed, and the analysis method. The analysis date and analysis method shall be supplied by the laboratory performing the analysis. The sample date, building, school and LEA name shall be supplied by the inspector.

Under "Homogeneous Area(s)," the inspector shall describe the unique area where the samples have been taken.

Under the column "Owner Sample ID," the inspector shall include the unique number for each sample being submitted for laboratory analysis. The inspector shall leave sufficient room for the laboratory to supply information necessary for each sample.

Under the column "Lab Sample ID," the specific laboratory identification for each sample will be supplied.

Under the column "Asbestos Type," the laboratory shall supply the type of asbestos identified for each sample.

Under the column "Asbestos %," the laboratory shall supply the percent of asbestos for each sample.

Under the column "Comments," additional information will be supplied, such as the gross sample appearance, sample treatment, other fibrous materials present, non-fibrous materials present, and whether or not the sample material appears to be friable.

At the bottom of this form, enter the name and address of the laboratory performing the analysis, the NVLAP Laboratory #, the typed name and signature of the person who performed the analysis and the date of the signature.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

LEA: _____

School: _____

Building: _____

RESOURCES NEEDED

EVALUATION OF RESOURCES NEEDED

PHOTOCOPYING PERMITTED

Instructions for Resources Needed

Purpose: To provide an evaluation of resources needed to complete response actions, carry out reinspections, operations and maintenance activities, periodic surveillance and training as described in 40 CFR Part 763.93(e)(11), EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: Enter the name of the LEA, the school, and the building in the top right-hand corner.

Under "Evaluation of Resources Needed," discussion should include information regarding funding required for equipment, facilities, support personnel, training, reinspections, periodic surveillance, etc. When appropriate, for example when response actions differ, this discussion shall be supplied for each homogeneous area; however, homogeneous areas can be combined if the resources required are the same for each.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

LEA: _____

School: _____

Building: _____

STEPS TO INFORM OTHERS

DISCUSSION OF PROGRAM TO INFORM OTHERS

PHOTOCOPYING PERMITTED

Instructions for Steps to Inform Others

Purpose: To provide steps taken to inform others of actions taken as required by 40 CFR Part 763.93(e)(10) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: Enter the name of the LEA, the school, and the building in the top right-hand corner.

In the discussion section of this form, information should be included that describes steps taken to inform workers and building occupants, or their legal guardians, about inspections, reinspections, response actions, and post response action activities, including periodic reinspection and surveillance activities that are planned or in progress.

The individual responsible for conducting the annual notification should be identified on this form (either by name or by position name) along with the time of year the notifications will be conducted. Also should describe how the Designee will document how the annual notification requirement was met (e.g., copies of the student handbook will be kept with the school's asbestos information).

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional copies, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH

LEA: _____

School: _____

Building: _____

REINSPECTION PLAN

DISCUSSION OF REINSPECTION PLAN

PHOTOCOPYING PERMITTED

Instructions for Reinspection Plan

Purpose: The information required on this form is described in 40 CFR Part 763.93(e)(9) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: Enter the name of the LEA ("LEA" refers to the public school system, or individual private school), the school, and the building in the upper right-hand corner.

The requirements for reinspection plan are described in paragraph 763.85(b) and shall include frequency (at least every 3 years), address all friable and nonfriable known and assumed ACBM, performance by an accredited inspector, visual reinspection and reassessment, touching of materials to determine changes of condition, identification of homogeneous areas where material has become friable since the last inspection, sampling of areas assumed to contain ACBM, reassessment of areas where condition of materials has changed, recording the dates of reinspection, changes in condition of materials, exact sample location, manner used to determine sampling locations, and names and signatures of persons making the reinspections, taking samples and reassessing the materials, accreditation numbers, and states of accreditation.

This form should be used to identify who at the school will be responsible for initiating the reinspection process. It should state that an accredited asbestos inspector and/or management planner will be contracted to conduct the reinspection. The plan should also indicate when the first reinspection will be conducted and include a description of how the reinspection will be conducted, similar to the description above.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

LEA: _____

School: _____

Building: _____

DESCRIPTION OF EACH SAMPLE AREA

Date	Each Sample Location	Discussion

Inspector

Typed Name:	Signature:	Date:
Accreditation Number:	Agency:	

PHOTOCOPYING PERMITTED

Instructions for Description of Each Sample Area

Purpose: To provided a description that identifies clearly the location where each sample was collected as referenced in 40 CFR Part 763.93 (e)(3)(ii) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: Enter the LEA name, the school, and the building in the top right-hand corner.

For each sample taken, the date that the sample was taken and the specific location for each sample shall be indicated.

Under "Discussion," for each homogeneous area, information shall be supplied to include the approximate square or linear footage of the homogeneous area being sampled.

Information on this form can be supplied on a blueprint, diagram, or a written description for each school building and each homogeneous area.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

LEA: _____

School: _____

Building: _____

OPERATIONS AND MAINTENANCE PLAN

DISCUSSION OF OPERATIONS, MAINTENANCE AND REPAIR PLAN

HOMOGENEOUS AREA:

PHOTOCOPYING PERMITTED

Instructions for Operations and Maintenance Plan

Purpose: To record operations, maintenance and repairs to a homogeneous area as required by 40 CFR Part 763.93(e)(9) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: Enter the name of the LEA ("LEA" refers to the public school system, or individual private school), the school, and the building in the top right-hand corner.

For each homogeneous area (HGA) of friable ACBM, assumed ACBM, or ACBM about to become friable, write an operations, maintenance and repair (O&M) program as described in paragraph 763.91. The program shall describe, in detail, worker protection, initial and additional cleaning programs, building occupant protection (access control, signs, control of air movement, work practices, area cleaning, disposal methods), training, work authorization, definition of small-scale, short-duration projects so the limits of O&M work are established and the LEA Designee is aware of when design and other performance requirements become applicable, disposal, recordkeeping, and activities associated with minor and major fiber release episodes.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH

LEA: _____

School: _____

Building: _____

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA (S): _____

_____

HGA ID and Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			

Inspector

Typed Name:	Signature:	Date:
Accreditation Number:	Training Agency:	

PHOTOCOPYING PERMITTED

Instructions for Assessment of Materials

Purpose: The information required by this form is referenced in 40CFR Part 763.93(e)(3)(v) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: At the right-hand corner fill in the name of the LEA ("LEA" refers to the public school system, or individual private school), the school and the building.

As described in 763.88(a), (b), and (c), for each homogeneous area where ACBM is known or assumed, the inspector shall classify and assess the materials. A classification and assessment shall be made for each homogeneous area. Use a separate page for each homogenous area. Do not crowd the information.

Under "Homogeneous Area(s)", include the HGA unique identifier and a brief description of the material. More than one HGA may be included on this form.

Under "HGA ID and Sample ID," indicate each unique HGA identifier, and sample number assigned by the inspector or the owner.

Under "Asbestos," when the sample has been found to contain more than 1% asbestos, the type of asbestos and the percent of asbestos will be indicated.

Under "Photo", a reference will be made to indicate the unique number assigned to any photograph taken to be used in this report or in the future.

Under "Assessment," the inspector shall classify the ACBM as required in paragraph 763.88(b), into one of the following categories: 1) damaged or significantly damaged thermal insulation ACM; 2) damaged friable surfacing ACM; 3) significantly damaged friable surfacing ACM; 4) damaged or significantly damaged friable miscellaneous ACM; 5) ACBM with potential for damage; 6) ACBM with potential for significant damage; 7) any remaining friable ACBM or friable suspected ACBM.

Under "Comments," the inspector shall include information such as location, the amount of material, the condition of the material, type of damage or significant damage, severity of damage, extent for spread of damage, accessibility, potential for disturbance, known or suspected causes of damage, preventive measures which might reduce or eliminate fiber disturbance, and/or other comments and recommendations appropriate to the conditions observed.

At the bottom of this form, the inspector shall include the typed name, signature, date of signature, unique accreditation number and the name of the training agency at which training was obtained.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH

LEA: _____

School: _____

Building: _____

PERIODIC SURVEILLANCE PLAN

DISCUSSION OF PERIODIC SURVEILLANCE PLAN

PHOTOCOPYING PERMITTED

Instructions for Periodic Surveillance Plan

Purpose: To provide a periodic surveillance plan as required by 40CFR Part 763.93(e)(9) of the EPA Asbestos Containing Materials in Schools; Final Rule and Notice.

Preparation: Enter the name of the LEA ("LEA" refers to the public school system, or individual private school), the school, and the building in the top right-hand corner.

Discuss the Periodic Surveillance Plan described in paragraph 763.92(b) requiring a periodic surveillance of each building with ACBM at least every 6 months. Explain that each person performing periodic surveillance shall visually inspect the areas, record the date, area of inspection, inspector's name, and description of any changes of the materials. Include the individual (either by name or position name) responsible for conducting periodic surveillances and reference when the first periodic surveillance will be conducted. A copy of the periodic surveillance record shall be included in the management plan and submitted to the LEA Designee.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

NC Department of Health & Human Services
Health Hazards Control Unit
Asbestos Hazard Management Program

NEW BUILDING MANAGEMENT PLAN SUBMITTAL GUIDANCE

School buildings built after October 12, 1988, can be exempted from the inspection requirements of the AHERA regulations [40 CFR PART 763.99(A)(7)] if the Local Education Agency (LEA) can obtain documentation that the building(s) was constructed using no asbestos-containing building materials (ACBM). This documentation must be a written statement from the architect or project engineer responsible for the construction of the building(s) and must be included with the management plan. As an alternative to the statement from the architect or project engineer, an accredited asbestos inspector can review the building documents and provide a written statement that no ACBM was used in the building. The accredited asbestos inspector's statement must be included with the management plan. If the school building(s) was constructed after October 12, 1988, and this inspection exemption is used, the following guidelines must be followed when developing the school's management plan:

1) The above-mentioned written statement must include the name of the school along with its address, construction dates and the signature of the architect, engineer, or accredited inspector.

2) A copy of the signed statement must be submitted to the Health Hazards Control Unit as part of the school's Management Plan. The Management Plan should also include the following:

   a. A completed AHERA Management Plan Cover Sheet (DHHS 3531). Where a signed statement from an architect, engineer, or inspector will be submitted in lieu of an inspection, the cover page should include signatures of the LEA Designee and the school superintendent.

   b. A completed School Buildings Form (DHHS 3532)

   c. Steps to Inform Others Form (DHHS 3538)

      Sections 763.84(c) and 763.93(g)(4) of the AHERA regulations require annual written notification to parents, teachers, and other building occupants about the availability and location of the school's Management Plan – even if there is no ACBM in the building.

      The information provided on DHHS 3538 should contain the school's policy on how they will conduct the annual written notification to parents, teachers, and other building occupants about the availability of the architect's, engineer's, or accredited inspector's statement that no ACBM was used in the construction of the building.

The written, signed statement and above items a, b, and c make up the Management Plan for the school and must be kept on file at the school and the administrative office along with a copy of the most current written notification. Steps 1 and 2 must be completed and the Management Plan must be in place prior to the new building(s) being used as a school building.

Please be advised that while the above documentation will exempt a school from the AHERA inspection requirements, there are additional state and federal asbestos regulations which require the sampling of suspect ACBMs prior to disturbance by renovation or demolition, regardless of the existence of an architect's letter or even a Material Safety Data Sheet (MSDS).

For further information and copies of the forms, please contact the Health Hazards Control Unit at 919-707-5950.

Revised 4/06; 4/08; 5/08; 4/10 rlh

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

for which a waiver was granted under this section, a responsible official in the lead agency shall submit such changes to EPA.

(g) *Reports.* The lead agency in each State that has been granted a waiver by EPA from any requirement of subpart E of this part shall submit a report to the Regional Administrator for the Region in which the State is located at least once every 12 months to include the following information:

(1) A summary of the State's implementation and enforcement activities during the last reporting period relating to provisions waived under this section, including enforcement actions taken.

(2) Any changes in the administration or enforcement of the State program implemented during the last reporting period.

(3) Other reports as may be required by EPA to carry out effective oversight of any requirement of this subpart E that was waived under this section.

(h) *Oversight.* EPA may periodically evaluate the adequacy of a State's implementation and enforcement of and resources devoted to carrying out requirements relating to the waiver. This evaluation may include, but is not limited to, site visits to local education agencies without prior notice to the State.

(i) *Informal conference.* (1) EPA may request that an informal conference be held between appropriate State and EPA officials when EPA has reason to believe that a State has failed to:

(i) Substantially comply with the terms of any provision that was waived under this section.

(ii) Meet the criteria under paragraph (d) of this section, including the failure to carry out enforcement activities or act on violations of the State program.

(2) EPA will:

(i) Specify to the State those aspects of the State's program believed to be inadequate.

(ii) Specify to the State the facts that underlie the belief of inadequacy.

(3) If EPA finds, on the basis of information submitted by the State at the conference, that deficiencies did not exist or were corrected by the State, no further action is required.

(4) Where EPA finds that deficiencies in the State program exist, a plan to correct the deficiencies shall be negotiated between the State and EPA. The plan shall detail the deficiencies found in the State program, specify the steps the State has taken or will take to remedy the deficiencies, and establish a schedule for each remedial action to be initiated.

(j) *Rescission.* (1) If the State fails to meet with EPA or fails to correct deficiencies raised at the informal conference, EPA will deliver to the Governor of the State and a responsible official in the lead agency a written notice of its intent to rescind, in whole or part, the waiver.

(2) EPA will issue for publication in the FEDERAL REGISTER a notice that announces the rescission of the waiver, describes those aspects of the State's program determined to be inadequate, and specifies the facts that underlie the findings of inadequacy.

§ 763.99 Exclusions.

(a) A local education agency shall not be required to perform an inspection under § 763.85(a) in any sampling area as defined in 40 CFR 763.103 or homogeneous area of a school building where:

(1) An accredited inspector has determined that, based on sampling records, friable ACBM was identified in that homogeneous or sampling area during an inspection conducted before December 14, 1987. The inspector shall sign and date a statement to that effect with his or her State of accreditation and if applicable, accreditation number and, within 30 days after such determination, submit a copy of the statement to the person designated under § 763.84 for inclusion in the management plan. However, an accredited inspector shall assess the friable ACBM under § 763.88.

(2) An accredited inspector has determined that, based on sampling records, nonfriable ACBM was identified in that homogeneous or sampling area during an inspection conducted before December 14, 1987. The inspector shall sign and date a statement to that effect with his or her State of accreditation and if applicable, accreditation number

and, within 30 days after such determination, submit a copy of the statement to the person designated under §763.84 for inclusion in the management plan. However, an accredited inspector shall identify whether material that was nonfriable has become friable since that previous inspection and shall assess the newly-friable ACBM under §763.88.

(3) Based on sampling records and inspection records, an accredited inspector has determined that no ACBM is present in the homogeneous or sampling area and the records show that the area was sampled, before December 14, 1987 in substantial compliance with §763.85(a), which for purposes of this section means in a random manner and with a sufficient number of samples to reasonably ensure that the area is not ACBM.

(i) The accredited inspector shall sign and date a statement, with his or her State of accreditation and if applicable, accreditation number that the homogeneous or sampling area determined not to be ACBM was sampled in substantial compliance with §763.85(a).

(ii) Within 30 days after the inspector's determination, the local education agency shall submit a copy of the inspector's statement to the EPA Regional Office and shall include the statement in the management plan for that school.

(4) The lead agency responsible for asbestos inspection in a State that has been granted a waiver from §763.85(a) has determined that, based on sampling records and inspection records, no ACBM is present in the homogeneous or sampling area and the records show that the area was sampled before December 14, 1987, in substantial compliance with §763.85(a). Such determination shall be included in the management plan for that school.

(5) An accredited inspector has determined that, based on records of an inspection conducted before December 14, 1987, suspected ACBM identified in that homogeneous or sampling area is assumed to be ACM. The inspector shall sign and date a statement to that effect, with his or her State of accreditation and if applicable, accreditation number and, within 30 days of such determination, submit a copy of the statement to the person designated under §763.84 for inclusion in the management plan. However, an accredited inspector shall identify whether material that was nonfriable suspected ACBM assumed to be ACM has become friable since the previous inspection and shall assess the newly friable material and previously identified friable suspected ACBM assumed to be ACM under §763.88.

(6) Based on inspection records and contractor and clearance records, an accredited inspector has determined that no ACBM is present in the homogeneous or sampling area where asbestos removal operations have been conducted before December 14, 1987, and shall sign and date a statement to that effect and include his or her State of accreditation and, if applicable, accreditation number. The local education agency shall submit a copy of the statement to the EPA Regional Office and shall include the statement in the management plan for that school.

(7) An architect or project engineer responsible for the construction of a new school building built after October 12, 1988, or an accredited inspector signs a statement 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. The local education agency shall submit a copy of the signed statement of the architect, project engineer, or accredited inspector to the EPA Regional Office and shall include the statement in the management plan for that school.

(b) The exclusion, under paragraphs (a) (1) through (4) of this section, from conducting the inspection under §763.85(a) shall apply only to homogeneous or sampling areas of a school building that were inspected and sampled before October 17, 1987. The local education agency shall conduct an inspection under §763.85(a) of all areas inspected before October 17, 1987, that were not sampled or were not assumed to be ACM.

(c) If ACBM is subsequently found in a homogeneous or sampling area of a local education agency that had been identified as receiving an exclusion by

an accredited inspector under paragraphs (a) (3), (4), (5) of this section, or an architect, project engineer or accredited inspector under paragraph (a)(7) of this section, the local education agency shall have 180 days following the date of identification of ACBM to comply with this subpart E.

APPENDIX A TO SUBPART E—INTERIM TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL METHODS—MANDATORY AND NONMANDATORY—AND MANDATORY SECTION TO DETERMINE COMPLETION OF RESPONSE ACTIONS

I. Introduction

The following appendix contains three units. The first unit is the mandatory transmission electron microscopy (TEM) method which all laboratories must follow; it is the minimum requirement for analysis of air samples for asbestos by TEM. The mandatory method contains the essential elements of the TEM method. The second unit contains the complete non-mandatory method. The non-mandatory method supplements the mandatory method by including additional steps to improve the analysis. EPA recommends that the non-mandatory method be employed for analyzing air filters; however, the laboratory may choose to employ the mandatory method. The non-mandatory method contains the same minimum requirements as are outlined in the mandatory method. Hence, laboratories may choose either of the two methods for analyzing air samples by TEM.

The final unit of this Appendix A to subpart E defines the steps which must be taken to determine completion of response actions. This unit is mandatory.

II. Mandatory Transmission Electron Microscopy Method

A. Definitions of Terms

1. *Analytical sensitivity*—Airborne asbestos concentration represented by each fiber counted under the electron microscope. It is determined by the air volume collected and the proportion of the filter examined. This method requires that the analytical sensitivity be no greater than 0.005 structures/cm^3.

2. *Asbestiform*—A specific type of mineral fibrosity in which the fibers and fibrils possess high tensile strength and flexibility.

3. *Aspect ratio*—A ratio of the length to the width of a particle. Minimum aspect ratio as defined by this method is equal to or greater than 5:1.

4. *Bundle*—A structure composed of three or more fibers in a parallel arrangement with each fiber closer than one fiber diameter.

5. *Clean area*—A controlled environment which is maintained and monitored to assure a low probability of asbestos contamination to materials in that space. Clean areas used in this method have HEPA filtered air under positive pressure and are capable of sustained operation with an open laboratory blank which on subsequent analysis has an average of less than 18 structures/mm^2 in an area of 0.057 mm^2 (nominally 10 200-mesh grid openings) and a maximum of 53 structures/mm^2 for any single preparation for that same area.

6. *Cluster*—A structure with fibers in a random arrangement such that all fibers are intermixed and no single fiber is isolated from the group. Groupings must have more than two intersections.

7. *ED*—Electron diffraction.

8. *EDXA*—Energy dispersive X-ray analysis.

9. *Fiber*—A structure greater than or equal to 0.5 μm in length with an aspect ratio (length to width) of 5:1 or greater and having substantially parallel sides.

10. *Grid*—An open structure for mounting on the sample to aid in its examination in the TEM. The term is used here to denote a 200-mesh copper lattice approximately 3 mm in diameter.

11. *Intersection*—Nonparallel touching or crossing of fibers, with the projection having an aspect ratio of 5:1 or greater.

12. *Laboratory sample coordinator*—That person responsible for the conduct of sample handling and the certification of the testing procedures.

13. *Filter background level*—The concentration of structures per square millimeter of filter that is considered indistinguishable from the concentration measured on a blank (filters through which no air has been drawn). For this method the filter background level is defined as 70 structures/mm^2.

14. *Matrix*—Fiber or fibers with one end free and the other end embedded in or hidden by a particulate. The exposed fiber must meet the fiber definition.

15. *NSD*—No structure detected.

16. *Operator*—A person responsible for the TEM instrumental analysis of the sample.

17. *PCM*—Phase contrast microscopy.

18. *SAED*—Selected area electron diffraction.

19. *SEM*—Scanning electron microscope.

20. *STEM*—Scanning transmission electron microscope.

21. *Structure*—a microscopic bundle, cluster, fiber, or matrix which may contain asbestos.

22. *S/cm^3*—Structures per cubic centimeter.

23. *S/mm^2*—Structures per square millimeter.

24. *TEM*—Transmission electron microscope.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH

LEA: ABC Private School

State System #: N/A

Address: 123 Broad Street

Teaville, North Carolina 22345

County: Thomas County

Telephone: 252-777-4563

AHERA MANAGEMENT PLAN COVER SHEET

Management Plan Submission: X Original Resubmittal X New Building Reinspection

List of Documents Attached:

x School Buildings	Periodic Surveillance Plan	Bulk Sample Analysis Form
Preventive Measures and Response Actions Scheduled	Reinspection Plan	Resources Needed
	Assessment of Materials	x Steps to Inform Others
Response Actions Recommended	Description of Each Sample Area	Reinspection Report
Operations and Maintenance Plan	Determination of Sampling Locations	

LEA AHERA DESIGNEE

Typed Name: Dr. Alicia Clark

Mailing Address: 123 Broad Street

Teaville, NC 22345

Name of Training Course: EPA Self-Study Guide

Year 2008 Month July Day 15-17 Total Hours of Course 12

Name of Training Agency: N/A

MANAGEMENT PLANNER

Typed Name: _____ Signature: _____ Date _____

NC Accreditation Number: _____ Agency: _____

INSPECTOR

Typed Name: _____ Signature: _____ Date: _____

NC Accreditation Number: _____ Agency: _____

For persons who performed inspections, and recommend(ed) design, or carry out response actions (except for operations and maintenance) the local education agency used or will use persons who have been accredited by the State of North Carolina under Article 19, N.C. Gen.Stat. §130A--447 and 10A NCAC 41C .0602(a) of the Asbestos Hazard Management Program Rules. In addition, the LEA has considered whether any conflict of interest may arise from the interrelationship among accredited personnel, such as abatement activities being performed by an inspector or management planner, and whether that should influence the selection of accredited personnel to perform activities under this AHERA Program.

The signatories below certify that the general local education agency responsibilities, as stipulated by Part 763.84 have been met or will be met.

Signature: Dr. Alicia Clark
LEA AHERA Designee

Date: 9-14-2009

Signature: Dr. Alicia Clark
LEA Superintendent

Dr. Alicia Clark
Typed Name of Superintendent

Date: 9-14-2009

FOR REVIEWING AGENCY USE ONLY

Accepted
Returned for Reasons Stated Below

Reviewer's Signature: _____

Date: _____

Example

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: ABC Private School

School: (same)

State School System #: N/A

SCHOOL BUILDINGS

Building	Location	Check boxes for the presence of: Friable ACBM	Non-Friable ACBM	Assumed Friable ACBM	Assumed Non-Friable ACBM	No ACBM
1 Main/classroom	Street Address: 123 Broad Street City: Teaville, NC Zip: 22345					X
2. Gym	Street Address: 123 Broad Street City: Teaville, NC Zip: 22345					X
3.	Street Address: City: Zip:					
4.	Street Address: City: Zip:					
5.	Street Address: City: Zip:					
6.	Street Address: City: Zip:					
7.	Street Address: City: Zip:					
8.	Street Address: City: Zip:					
9.	Street Address: City: Zip:					
10.	Street Address: City: Zip:					
11.	Street Address: City: Zip:					
12.	Street Address: City: Zip:					

ACBM = Asbestos Containing Building Material

Example

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA: ABC Private School

School: N/A

Building: All

STEPS TO INFORM OTHERS

DISCUSSION OF PROGRAM TO INFORM OTHERS

The LEA Designee will, at the beginning of each school year, ensure that information about the school's asbestos management program will be included in the student handbook distributed to all students. This information will also be posted on the informational bulletin board in the administrative office. This is the same bulletin board on which is posted important information for all staff (teacher's and other employees). Because we have no identified asbestos-containing building materials in our school, our notification will state that we are aware of the state and federal asbestos regulations, and that we are in compliance. It will also state that we have no known asbestos-containing building materials in our school, that our management plan is on file in the principal's office, is considered public information and is available for review at any time.

Contact information for the LEA Designee will also be included in the annual notification.

Copies of the posting and the student handbook will be kept each year and added to the notebook containing the asbestos management plan as documentation that we have complied with this requirement.

Example

ROBINSON AND CRUSOE, RA

ARCHITECTURAL FIRM

GREEN IS OUR ETHIC

Example

August 8, 2008

Dr. Alicia Clark
School Administrator/Principal
ABC Private School
123 Broad Street
Teaville, NC 22345

Subject: Construction of ABC Private School

Dear Dr. Clark:

Thank you for the opportunity to work on your school. We constructed both the classroom/main building and the gymnasium for the ABC Private School located at 123 Broad Street, Teaville, NC in 2007. Construction began in March 2007, and we were able to finish in August 2007, just before the start of the new school year.

To the best of my knowledge, there were no asbestos-containing building materials used or specified for use in the construction of your school.

If you have any questions, need additional information, or if we can be of any further service to you please do not hesitate to contact us. Again, it was a pleasure doing business with you.

Sincerely,

Frank Crusoe, RA
Vice President and Lead Creative Architect
Robinson and Crusoe, RA

If you have no known asbestos in your school, your annual notification may look like this:

TO: ALL PARENTS AND STAFF OF ABC SCHOOLS

FROM: GEORGE WASHINGTON, MAINTENANCE DIRECTOR

RE: REQUIRED ANNUAL AHERA NOTIFICATIONS

DATE: SEPTEMBER 2006

In the Fall of 1988, in compliance with the US Environmental Protection Agency (EPA) Asbestos Hazards Emergency Response Act (AHERA), we had inspections conducted in each of our school buildings for the purpose of identifying asbestos-containing building materials (ACBMs). No ACBMs were identified. The inspection findings were included in an asbestos Management Plan which has been on file in the school administrative office since that time.

-----OR-----

The US Environmental Protection Agency's (EPA) Asbestos Hazard Emergency Response Act (AHERA) requires all schools to inspect building materials for the presence of asbestos. AHERA excludes schools from the inspection requirement if the school was constructed after October 12, 1988, and has a signed statement from the architect or project engineer responsible for constructing the school stating that no asbestos-containing building materials were specified for use in the construction of the school. Our school has been provided such a statement, and is, therefore, exempt from the requirement to conduct an asbestos inspection.

----AND----

The EPA requires us to annually notify you that we are aware of the AHERA regulation, and that we are in compliance. The Management Plan is available for your review at anytime during normal school hours (Monday – Friday, 8:30 A.M. – 3:00 P.M.). The Asbestos Program Manager, Thomas Jefferson, is available to answer any questions you may have about asbestos in our buildings (919-555-1212).

Example

Chapter 5: Reinspections

REINSPECTIONS

Sections:

Example Reinspection Report

Blank Reinspection Forms

EPA's Answers to the Most Frequently Asked Questions About Reinspections

Sufficient Sampling of Miscellaneous Materials (original surveys may not have taken enough samples)

NC DEPARTMENT OF
HEALTH AND HUMAN SERVICES

ROY COOPER • Governors
MANDY COHEN, MD, MPH • Secretarys
MARK T. BENTON • Assistant Secretary for Public Health,s
Division of Public Health

January 15, 2021

TO:s NC Accredited Management Planners and LEA Designeess

FROM: Ed Norman
Ed Norman, MPH, Program Manager
NC Health Hazards Control Unit (HHCU)s

SUBJECT: Common Problems with AHERA Reinspection Reports

The North Carolina Health Hazards Control Unit (HHCU) administers the Asbestos Hazard Emergency Response Act (AHERA) in North Carolina. AHERA management plans are required for schools designated as Public, Non-Public (not-for-profit) and Charter schools. When school buildings and structures have been inspected and found to have asbestos-containing materials (ACM), an AHERA reinspection report must be submitted to the HHCU every 3 years.

Inspectors and management planners developing management plans and reinspection reports shall comply with all requirements of 40 CFR Part 763, Subpart E, and 10A NCAC 41C .0604. During the review of reinspection reports, the HHCU has found common problems. These repeated problems include:

- Using outdated HHCU forms for the reinspection reports. Current forms are available at:s https://epi.dph.ncdhhs.gov/asbestos/forms.html.s

- Using one HGA identification for multiple types of Asbestos Containing Building Material (ACBM).s
- Providing a new school name or change in room numbers without providing the previous school name ors room numbers on the reinspection report.s
- Not providing an adequate description of the ACM (e.g., omitting quantity, colors, distinguishings marks/patterns).s
- Providing vague descriptions for locating HGAs.s
- Management planner or inspector signatures missing or no date on the forms.s
- Reinspection report form DHHS 3778: Missing information under Section 4 'Assessment':s
  - 4a. This is commonly left blank. No indication of condition status or change to the materials
  - 4b. Condition code not provided. See form instructions for these codess
  - 4c. Comments section, example of missing information:
    - Total quantity of the HGAs
    - Type of damage, severity/extent/ and spread of damages
    - Accessibility of the HGAs
    - Potential for disturbances
    - Any additional comments on the condition of this materials
    - No specific locations of the identified ACBMss
- Response actions that do not match the assessment category.s
- Not providing updated information if the school has moved, been closed, sold, demolished, or no longers used as a school.s

The problems identified during the review by the Program need to be addressed by the management planners befores submitting the revised AHERA reinspection report to the HHCU. Failure to provide accurate and complete information on the AHERA reinspection report could result in the EPA issuing a violation and civil penalties.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

AHERA MANAGEMENT PLAN COVER SHEET

LEA: Brooks County School System

State System #: 000

Address: 512 Main Street

Winston, NC 28888

County: Brooks County

Telephone: (919)-555-1212

Management Plan Submission: Original Resubmittal New Building Reinspection

FICTIONAL REINSPECTION EXAMPLE

List of Documents Attached:

School Buildings	Periodic Surveillance Plan	Bulk Sample Analysis Form
Preventive Measures and Response Actions Scheduled	Reinspection Plan	Resources Needed
	Assessment of Materials	Steps to Inform Others
Response Actions Recommended	Description of Each Sample Area	X Reinspection Report
Operations and Maintenance Plan	Determination of Sampling Locations	

LEA AHERA DESIGNEE

Typed Name: John R. Doe

Name of Training Course: LEA AHERA Designee Training

Mailing Address: 1412 Anywhere Street, PO Box 1000

Year 1988 Month 04 Day 05 Total Hours of Course 8

Anywhere, NC 27555

Name of Training Agency: NC Division of Public Health

MANAGEMENT PLANNER

Typed Name: Joe Schmoe Signature: Date: 06/01/1992

NC Accreditation Number: 20015 Agency: UNC OSHERC

INSPECTOR

Typed Name: Joe Schmoe Signature: Date: 06/01/1992

NC Accreditation Number: 10003 Agency: UNC OSHERC

For persons who performed inspections, and recommend(ed) design, or carry out response actions (except for operations and maintenance) the local education agency used or will use persons who have been accredited by the State of North Carolina under Article 19, N.C. Gen.Stat. §130A--447 and 10A NCAC 41C .0602(a) of the Asbestos Hazard Management Program Rules. In addition, the LEA has considered whether any conflict of interest may arise from the interrelationship among accredited personnel, such as abatement activities being performed by an inspector or management planner, and whether that should influence the selection of accredited personnel to perform activities under this AHERA Program.

The signatories below certify that the general local education agency responsibilities, as stipulated by Part 763.84 have been met or will be met.

Signature: _____
LEA AHERA Designee

Date: 06/18/1992

Signature: _____
LEA Superintendent

Howard J. Easom
Typed Name of Superintendent

Date: 06/21/1992

FOR REVIEWING AGENCY USE ONLY

Accepted
Returned for Reasons Stated Below

Reviewer's Signature: _____

Date: _____

DHHS 3531 (Revised 6/03)
Health Hazards Control Unit

PHOTOCOPYING PERMITTED

Instructions for AHERA Management Plan Cover Sheet

Purpose: The LEA (Local Education Agency) shall use this AHERA Management Plan Cover Sheet for any complete or partial submittals of a Management Plan to the Health Hazards Control Unit (HHCU).

Preparation:

1. The LEA should type their name, state system number, address, county and phone number in the top right-hand corner.

2. Place a check mark (✔) to indicate whether this is the original submittal, a resubmittal, a new building or reinspection. Place a check mark (✔) by "New Building," if this is a submittal for a new building that is to be occupied. "New Building" will only be used after an original submittal has been made and when, at a later date, the LEA is acquiring or moving into a new facility.

3. Under List of Documents, make a check mark (✔) to indicate each form that is being submitted with this Management Plan Cover Sheet. All of the indicated documents should be attached to this cover sheet in order for a Management Plan to be considered complete. It would be helpful if they were in the order listed, so they can be easily reviewed.

4. The name and signature of the LEA AHERA designee shall be supplied along with designee's mailing address, telephone number and the name of the training courses taken. For training courses taken by the LEA AHERA designee, the time of those courses shall also be included, such as the year, month, day, total hours of the course and the training agency where the training was received.

5. The Management Planner and Inspector should sign and date the document in the appropriate signature block. The Management Planner and Inspector will also supply the unique accreditation number and the name of the training agency at which training was received.

6. The LEA AHERA Designee should sign and date after reading the above review requirements.

7. The LEA Superintendent should sign and date after reading the above review requirements. Type the name of the Superintendent on the appropriate line.

Distribution: The Cover Sheet and attachments should be mailed to:

NCDHHS/Public Health
Occupational & Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy.

Additional Comments: After the review by the HHCU comments will be sent to the LEA Superintendent.

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA/System #: Brooks County Schools / 000

School Name and No: AUSTIN HIGH SCHOOL 000-312

AHERA REINSPECTION REPORT

Building(s): MAIN/ADMIN

Reinspection Date: 05/21/1992

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Non-friable)	4. ASSESSMENT			5. RESPONSE ACTION	
				a. No Change	b. Condition Code	c. Comments	Description	Begin/End Dates
Principals' offices and media center	HGA -001		2"x 2" white ceiling tile Original condition code: (4) damaged friable miscellaneous material		5	Approximately 10,000 sf of material; One water damaged tile (about 4 sf) in media center was removed in 5/89 by O&M trained workers. Replaced with non-asbestos tile	O&M	Immediate and On-going
Throughout Main/Admin Building (except in restrooms which have ceramic tile)	HGA-002		9" x 9" Brown Floor tiles Original condition code: (5) ACBM with potential for damage	X	5	Approx 20,000 square feet No damage observed	O&M	Immediate and On-going

INSPECTOR: Typed Name: Joe Schmoe Signature: _____

NC Accreditation Number: 10003 Date: 06/01/92

LEA DESIGNEE: Typed Name: Howard Easom

Date: _____ Signature: _____

MANAGEMENT PLANNER: Typed Name: Joe Schmoe Signature: _____

NC Accreditation Number: 20015 Date: 06/01/1992

PHOTO COPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

LEA/System #:_Brooks County Schools / 00_____

School Name and No:_Austin High School 000-312_____

AHERA REINSPECTION REPORT

Building(s):_____Cafeteria/Gym_____

Reinspection Date:_____06/01/1992_____

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Non-friable)	4. ASSESSMENT			5. RESPONSE ACTION	
				a. No Change	b. Condition Code	c. Comments	Description	Begin/End Dates
Girls and Boys Locker rooms; Above drop ceiling	HGA 005		Sprayed-on fireproofing; Original condition code: (2) Damaged friable surfacing ACM			Material (all 1,000 sf) removed in 7/89 by Slackers, ltd	Material removed	
Crawlspace under cafeteria	HGA 007		Pipe insulation; Original condition code: (1) Significantly damaged TSI	X	1	Approx 300 lf of material; crawlspace is padlocked and not accessible	O&M and Isolate (immediate and on-going) until Removal	Removal - scheduled for 6/1994
Boiler room near cafeteria	HGA 008		Insulation (TSI) on both the boiler and water tank Original condition code: (5) ACBM with potential for damage		5	Approx total of 400 sf of material on both units; Some isolated damage on right corner of boiler; Recommend clean-up and repair by O&M personnel	Repair O&M	7/15/1992 On-going
Water lines in cafeteria cleaning supply room	HGA 009		Insulation (TSI) on water lines Original condition code: (1) Damaged TSI		5	Approx 50 lf of material; damaged areas were repaired in 1989 by O&M personnel	O&M	Immediate and on-going
Water lines in cafeteria cleaning supply room (same lines as above)	HGA 010		Elbow fittings (TSI) on water lines Original condition code: (1) Damaged TSI		5	10 elbow fittings; two damaged elbows repaired in 1989 by O&M personnel	O&M	Immediate and on-going
Throughout all buildings on campus	HGA 011		Interior fire doors (assumed) Original condition code: (5) ACBM with potential for damage	X	5	Approx 20 doors; no damage noted	O&M	Immediate and on-going

INSPECTOR: Typed Name:_____Joe Schmoe_____ Signature:_____

NC Accreditation Number:____10003_____ Date:_____06/01/1992_____

LEA DESIGNEE: Typed Name:_____Howard Easom _____

Date:_____ Signature:_____

MANAGEMENT PLANNER: Typed Name:_____Joe Schmoe_____ Signature:_____

NC Accreditation Number:_____20015_____ Date:____06/01/1992_____

PHOTO COPYING PERMITTED

LEA/System #: Brooks County Schools /000

School Name and No.: Austin High School

Building: Cafeteria/Gym

AHERA REINSPECTION REPORT COMMENTS

HGA ID: 009 and 010 **MATERIAL DESCRIPTION:** TSI on water lines

HGA #009 is about 50 linear feet of pipe insulation on the water lines in the cafeteria cleaning supply room.

HGA #010 is the elbow fittings (10) on those same water lines.

Damage

The insulation and elbows had been damaged when the pipes leaked in 1988. The water line was repaired, but the insulation and elbows were not repaired until 1989 after recommendations made in the management plan.

At the time of the writing of this report, the insulation and elbows were in good condition with low potential for damage.

HGA ID: _____ **MATERIAL DESCRIPTION:** _____

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH

LEA:_____

State System #:_____

Address:_____

_____

County:_____

Telephone:_____

AHERA MANAGEMENT PLAN COVER SHEET

Management Plan Submission: ☐ Original ☐ Resubmittal ☐ New Building ☐ Reinspection

List of Documents Attached:

- ☐ School Buildings
- ☐ Preventive Measures and Response Actions Scheduled
- ☐ Response Actions Recommended
- ☐ Operations and Maintenance Plan
- ☐ Periodic Surveillance Plan
- ☐ Reinspection Plan
- ☐ Assessment of Materials
- ☐ Description of Each Sample Area
- ☐ Determination of Sampling Locations
- ☐ Bulk Sample Analysis Form
- ☐ Resources Needed
- ☐ Steps to Inform Others
- ☐ Reinspection Report

LEA AHERA DESIGNEE

Typed Name: _____ Name of Training Course: _____

Mailing Address: _____ Year _____Month_____Day_____Total Hours of Course _____

_____ Name of Training Agency: _____

MANAGEMENT PLANNER

Typed Name:_____ Signature:_____ Date_____

NC Accreditation Number:_____ Training Agency:_____

INSPECTOR

Typed Name:_____ Signature:_____ Date:_____

NC Accreditation Number:_____ Training Agency:_____

For persons who performed inspections, and recommend(ed) design, or carry out response actions (except for operations and maintenance) the local education agency used or will use persons who have been accredited by the State of North Carolina under Article 19, N.C. Gen.Stat. §130A--447 and 10A NCAC 41C .0602(a) of the Asbestos Hazard Management Program Rules. In addition, the LEA has considered whether any conflict of interest may arise from the interrelationship among accredited personnel, such as abatement activities being performed by an inspector or management planner, and whether that should influence the selection of accredited personnel to perform activities under this AHERA Program.

The signatories below certify that the general local education agency responsibilities, as stipulated by Part 763.84 have been met or will be met.

Signature:_____
LEA AHERA Designee

Date:_____

Signature:_____
LEA Superintendent

_____
Typed Name of Superintendent

Date:_____

FOR REVIEWING AGENCY USE ONLY

☐ Accepted
☐ Returned for Reasons Stated Below

Reviewer's Signature:_____

Date:_____

DHHS 3531 (Revised 6/03; 8/00; 8/11; 1/2013)
Health Hazards Control Unit

PHOTOCOPYING PERMITTED

Instructions for AHERA Management Plan Cover Sheet

Purpose: The LEA (Local Education Agency) shall use this AHERA Management Plan Cover Sheet for any complete or partial submittals of a Management Plan to the Health Hazards Control Unit (HHCU). Please note that "LEA" refers to the public school system, or individual private school, while "LEA AHERA Designee" refers to the individual responsible for managing the school's asbestos program

Preparation:

1. Type the LEA name, state system number (applicable only for public schools), address, county and phone number in the top right-hand corner.

2. Place a check mark (√) to indicate whether this is the original submittal, a resubmittal, a new building or reinspection. "New Building" will only be used when the LEA is acquiring or moving into a facility constructed after October 12, 1988.

3. Under List of Documents, make a check mark (√) to indicate each form that is being submitted with this Management Plan Cover Sheet. When ACBMs are identified, all of the indicated documents (except the Reinspection Report form) should be attached to this cover sheet in order for a Management Plan to be considered complete. It would be helpful if they were presented in the order listed, so they can be more easily reviewed.

4. The name and signature of the LEA AHERA Designee shall be supplied along with Designee's mailing address, telephone number and the name of the training courses taken. To complete the training course information, also include the year, month, day, total hours of the course and the training agency where the training was received.

5. The Management Planner and Inspector should sign and date the document in the appropriate signature block. The Management Planner and Inspector will also supply the unique accreditation number and the name of the training agency at which their training was received.

6. The LEA AHERA Designee should sign and date after reading the above review requirements.

7. The LEA Superintendent should sign and date after reading the above review requirements. Type the name of the Superintendent on the appropriate line. If the Designee and the Superintendent are the same person, s/he must still sign in both places. If this is a non-public or charter school, the head of school must sign in this signature block.

Distribution: The Cover Sheet and attachments should be mailed to:

NCDHHS/Public Health
Occupational & Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy, or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

Additional Comments: After the review by the HHCU, comments will be sent to the LEA Superintendent.

LEA/System #:_____

School Name and No:_____

Building(s):_____

School Address:_____

Reinspection Date:_____

AHERA REINSPECTION REPORT

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Nonfriable)	4. ASSESSMENT			5. RESPONSE ACTION	
				a. No Change	b. Condition Code	c. Comments	Description	Begin/End Dates

INSPECTOR: Typed Name:_____ Signature:_____

NC Accreditation Number:_____ Date:_____

LEA DESIGNEE: Typed Name:_____

Date:_____ Signature:_____

MANAGEMENT PLANNER: Typed Name:_____ Signature:_____

NC Accreditation Number:_____ Date:_____

PHOTO COPYING PERMITTED

Instructions for Reinspection Report

Purpose: The purpose of this form is to provide a uniform reporting format for information collected during reinspection/reassessment of schools with asbestos containing building materials (ACBM) under the Environmental Protection Agency's Asbestos-Containing Materials in Schools; Final Rule and Notice, 40 CFR, part 763.85(b).

Preparation: At the top right hand corner, fill in the name of the local education agency (LEA), state system number, school name, school number, the building(s), school address, and the date of the reinspection/reassessment.

1. Under "BUILDING AND/OR FUNCTIONAL SPACE," provide a description of the building (e.g., gymnasium, etc.) and functional space (e.g., classrooms, boiler room, etc.) in which the homogeneous area of ACBM is located.

2. Under "HGA ID," provide the number(s) and/or letter(s) that have been assigned to identify each homogeneous area of ACBM. These HGA IDS shall be the same as the one(s) found in the original Management Plan submitted to the State. If the homogeneous area is newly discovered, then a check mark (✓) shall be placed in the box under "N."

3. Under "MATERIAL DESCRIPTION (Friable/Nonfriable)," indicate whether the homogeneous area of ACBM is surfacing (SUR), Thermal System Insulation (TSI), or Miscellaneous (MIS). In addition to these categories, please provide a brief description of the homogeneous area of ACBM (e.g., Boiler Jacket Insulation, 2x4 Ceiling Tile, etc.). Also indicate whether the homogeneous area of ACBM is Friable (F) or Nonfriable (N). This can be denoted by F or N. Under this area the Inspector may record the assessment classification that is found in the Management Plan for each homogeneous area of ACBM.
NOTE: Description used should coincide with descriptions in the original Management Plan submitted.

4. "ASSESSMENT:"

   (a) If the condition of the homogeneous area of ACBM has not changed since the original inspection, a check mark (✓) should be placed in the box under "No Change." If there has been no change then the only other information needed is the inspector's, management planner's and designee's signature and date. Note: Per Section 763.88(d) of 40 CFR, Part 763, an accredited management planner must review each reinspection report.

   (b) If the homogeneous area of ACBM has become damaged or the potential for disturbance has changed, or if it is a newly discovered area, then the inspector shall classify/reclassify the area under
   (b) "Cond. Code," column in one of the following categories:

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

   (c) Under "Comments," the Inspector shall include information such as amount of material, type of damage, severity/extent/spread of damage, accessibility, potential for disturbance, and/or other comments appropriate to the conditions observed. As required, per Section 763.88(d) of 40 CFR, Part 763, an accredited Management Planner shall review these assessments and recommend the appropriate response actions to the LEA. This recommendation shall be recorded under this column of the form. If additional space is needed for comments, please attached an AHERA Reinspection Report Comment sheet (DHHS 3779).

5. Under "RESPONSE ACTIONS", the LEA shall describe what preventive measures or response actions they have selected for the newly discovered or reclassified homogeneous area of ACBM. In addition, the beginning and ending dates of the Response Actions shall be provided. All preventive measures and response actions selected by the LEA shall be sufficient to protect human health and the environment. They also shall be in line with Section 763.90 of 40 CFR, Part 763.

   NOTE: Each homogeneous area of ACBM may contain more than one measure or action. (e.g., Operations and Maintenance: 10/12/91 -- Until Removed; Removal: 07/92-08/92

6. The Inspector, Management Planner and LEA Designee shall provide the typed name, signature, NC accreditation number if applicable and date signed.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/PUBLIC HEALTH
HEALTH HAZARDS CONTROL UNIT
1912 MAIL SERVICE CENTER
RALEIGH, NC 27699-1912

Disposition: This form may be destroyed in accordance with Standard 3 of the *Records Disposition Schedule* published by the North Carolina Division of Archives and History.

For additional forms, please photocopy or refer to our website: http://www.epi.state.nc.us/epi/asbestos/forms.html

LEA/System #:_____

School Name and No.:_____

Building:_____

AHERA REINSPECTION REPORT COMMENTS

HGA ID:_____ MATERIAL DESCRIPTION:_____

HGA ID:_____ MATERIAL DESCRIPTION:_____

PHOTOCOPYING PERMITTED

Instructions for Reinspection Report Comments

Purpose: The purpose of this form is to provide additional space for recording/reporting information collected on homogeneous areas of asbestos-containing building materials (ACBM) during reinspection of schools. This form shall be used in conjunction with the AHERA Reinspection Report Form (DHHS 3778)

Preparation: At the top right corner, fill in the name of the local education agency (LEA), state system number, school name, school number, and building(s).

Under "HGA ID," provide the number(s) and/or letter(s) that have been assigned to identify each homogeneous area of ACBM.

Under "Material Description," provide a brief description of the homogeneous area of ACBM.

NOTE: "HGA ID" and "Material Description" shall coincide with the same information provided on the AHERA Reinspection Report Form (DHHS 3778)

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and attachment to DHHS 3778, AHERA Reinspection Report form and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

Disposition: This form may be destroyed in accordance with Standard 3 of the *Records Disposition Schedule* published by the North Carolina Division of Archives and History.

For additional forms, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

LEA: _____

School: _____

Building: _____

DESCRIPTION OF EACH SAMPLE AREA

Date	Each Sample Location	Discussion

Inspector

Typed Name:	Signature:	Date:
Accreditation Number:	Agency:	

PHOTOCOPYING PERMITTED

Instructions for Description of Each Sample Area

Purpose: To provided a description that identifies clearly the location where each sample was collected as referenced in 40 CFR Part 763.93 (e)(3)(ii) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: Enter the LEA name, the school, and the building in the top right-hand corner.

For each sample taken, the date that the sample was taken and the specific location for each sample shall be indicated.

Under "Discussion," for each homogeneous area, information shall be supplied to include the approximate square or linear footage of the homogeneous area being sampled.

Information on this form can be supplied on a blueprint, diagram, or a written description for each school building and each homogeneous area.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

LEA: _____

School: _____

Building: _____

DETERMINATION OF SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA

Inspector

Typed Name:	Signature:	Date:
Accreditation Number:	Agency:	

PHOTOCOPYING PERMITTED

Instructions for Determination of Sampling Locations

Purpose: To provide a description of the manner used to determine sampling locations as described in 40 CFR Part 763.93 (e)(3)(iii) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: Enter the name of the LEA, the school, and the building in the top right-hand corner.

Discuss the manner used to determine a homogeneous area and how to select the sample location within each homogeneous area.

At the bottom of this form, the inspector shall supply their name, signature, date of signature, unique accreditation number and the training agency where training was obtained.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

LEA: _____

School: _____

Building: _____

Sample Date: _____

Analysis Date: _____

Analysis Method: _____

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): _____

_____

Owner Sample ID	Lab Sample ID	Asbestos Type	Asbestos %	**Comments**

It is certified by the signature below that the laboratory identified below is accredited by the National Institute of Standards/Technology for polarized light microscope (PLM) analysis under the National Voluntary Laboratory Accreditation Program.

Laboratory:	Address:
NVLAP Laboratory #:	

Analysis Performed By:

Typed Name:	Signature:	Date:

PHOTOCOPYING PERMITTED

Instructions for Bulk Sample Analysis

Purpose: To provide a copy of analyses of bulk samples collected and analyzed as described in 40 CFR Part 763.93 (e)(3)(iv) of the EPA Asbestos-Containing Materials in Schools; Final Rule and Notice.

Preparation: In the top right-hand corner of this form, enter the name of the LEA, the school name, the building name, the date the sample(s) were taken, the date the sample(s) were analyzed, and the analysis method. The analysis date and analysis method shall be supplied by the laboratory performing the analysis. The sample date, building, school and LEA name shall be supplied by the inspector.

Under "Homogeneous Area(s)," the inspector shall describe the unique area where the samples have been taken.

Under the column "Owner Sample ID," the inspector shall include the unique number for each sample being submitted for laboratory analysis. The inspector shall leave sufficient room for the laboratory to supply information necessary for each sample.

Under the column "Lab Sample ID," the specific laboratory identification for each sample will be supplied.

Under the column "Asbestos Type," the laboratory shall supply the type of asbestos identified for each sample.

Under the column "Asbestos %," the laboratory shall supply the percent of asbestos for each sample.

Under the column "Comments," additional information will be supplied, such as the gross sample appearance, sample treatment, other fibrous materials present, non-fibrous materials present, and whether or not the sample material appears to be friable.

At the bottom of this form, enter the name and address of the laboratory performing the analysis, the NVLAP Laboratory #, the typed name and signature of the person who performed the analysis and the date of the signature.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

For additional forms, please photocopy or refer to our website:
http://www.epi.state.nc.us/epi/asbestos/forms.html

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANC
HEALTH HAZARDS CONTROL UNIT

BAD EXAMPLE

AHERA REINSPECTION REPORT

LEA/System #: Hershy County Schools
School Name and No: Hershy Elementary
Building(s): Main
School Address: 135 Main Street, Hershy, NC 27713
Reinspection Date: June 1, 2001

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Nonfriable)	4. ASSESSMENT a. No Change	4. ASSESSMENT b. Condition Code	4. ASSESSMENT c. Comments	5. RESPONSE ACTION Description	5. RESPONSE ACTION Begin/End Dates
Main – Boil Room	**HGA-01**		**TSI – N Pipe Insulation**	**X**	**5**	**Damage due to deterioration (15%). Recommend O&M**	**O&M**	**I&O**
Main - Classroom	**HGA-02**		**MIS-N Floor Tile**		**5**	**Classroom on ground floor - VAT is coming loose due to moisture problems.**	**O&M**	**I & O**
						Recommend O&M and removal by June of 2006	**Remove**	**June 1- July, 2006**

INSPECTOR: Typed Name: Bill Blackheart Signature:
NC Accreditation Number: 115252 Date: 6/1/01

LEA DESIGNEE: Typed Name: John R.Doe
Date: 11/15/2001 Signature:

MANAGEMENT PLANNER: Typed Name: Joan Jett Signature:
NC Accreditation Number: 200132 Date: 6/1/ 2001

PHOTO COPYING PERMITTED

BAD EXAMPLE

Instructions for Reinspection Report

Purpose: The purpose of this form is to provide a uniform reporting format for information collected during reinspection/reassessment of schools with asbestos containing building materials (ACBM) under the Environmental Protection Agency's Asbestos-Containing Materials in Schools; Final Rule and Notice, 40 CFR, part 763.85(b).

Preparation: At the top right hand corner, fill in the name of the local education agency (LEA), state system number, school name, school number, the building(s), school address, and the date of the reinspection/reassessment.

1. Under "BUILDING AND/OR FUNCTIONAL SPACE," provide a description of the building (e.g., gymnasium, etc.) and functional space (e.g., classrooms, boiler room, etc.) in which the homogeneous area of ACBM is located.

2. Under "HGA ID," provide the number(s) and/or letter(s) that have been assigned to identify each homogeneous area of ACBM. These HGA IDS shall be the same as the one(s) found in the original Management Plan submitted to the State. If the homogeneous area is newly discovered, then a check mark (✓) shall be placed in the box under "N."

3. Under "MATERIAL DESCRIPTION (Friable/Nonfriable)," indicate whether the homogeneous area of ACBM is surfacing (SUR), Thermal System Insulation (TSI), or Miscellaneous (MIS). In addition to these categories, please provide a brief description of the homogeneous area of ACBM (e.g., Boiler Jacket Insulation, 2x4 Ceiling Tile, etc.). Also indicate whether the homogeneous area of ACBM is Friable (F) or Nonfriable (N). This can be denoted by F or N. Under this area the Inspector may record the assessment classification that is found in the Management Plan for each homogeneous area of ACBM.
NOTE: Description used should coincide with descriptions in the original Management Plan submitted.

4. "ASSESSMENT:"

   (a) If the condition of the homogeneous area of ACBM has not changed since the original inspection, a check mark (✓) should be placed in the box under "No Change." If there has been no change then the only other information needed is the inspector's, management planner's and designee's signature and date. Note: Per Section 763.88(d) of 40 CFR, Part 763, an accredited management planner must review each reinspection report.

   (b) If the homogeneous area of ACBM has become damaged or the potential for disturbance has changed, or if it is a newly discovered area, then the inspector shall classify/reclassify the area under (b) "Cond. Code," column in one of the following categories:

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

   (c) Under "Comments," the Inspector shall include information such as amount of material, type of damage, severity/extent/spread of damage, accessibility, potential for disturbance, and/or other comments appropriate to the conditions observed. As required, per Section 763.88(d) of 40 CFR, Part 763, an accredited Management Planner shall review these assessments and recommend the appropriate response actions to the LEA. This recommendation shall be recorded under this column of the form. If additional space is needed for comments, please attached an AHERA Reinspection Report Comment sheet (DHHS 3779).

5. Under "RESPONSE ACTIONS", the LEA shall describe what preventive measures or response actions they have selected for the newly discovered or reclassified homogeneous area of ACBM. In addition, the beginning and ending dates of the Response Actions shall be provided. All preventive measures and response actions selected by the LEA shall be sufficient to protect human health and the environment. They also shall be in line with Section 763.90 of 40 CFR, Part 763.

   NOTE: Each homogeneous area of ACBM may contain more than one measure or action. (e.g., Operations and Maintenance: 10/12/91 -- Until Removed; Removal: 07/92-08/92

6. The Inspector, Management Planner and LEA Designee shall provide the typed name, signature, NC accreditation number if applicable and date signed.

Distribution: Attach to DHHS 3531, AHERA Management Plan Cover Sheet and mail to:

NCDHHS/PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT
1912 MAIL SERVICE CENTER
RALEIGH, NC 27699-1912

Disposition: This form may be destroyed in accordance with Standard 3 of the *Records Disposition Schedule* published by the North Carolina Division of Archives and History.

Reorder: Additional forms may be ordered from:

NCDHHS/PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT
1912 MAIL SERVICE CENTER
ALEIGH, NC 27699-1912

(Revised 10/2000)

BAD EXAMPLE

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

BAD EXAMPLE

LEA/System #: Hershy County Schools /123

School Name and No: Hershy Elementary /111

Building(s): Main / Gym

School Address: 135 Main Street, Hershy, NC 27713

Reinspection Date: June 1, 2001

AHERA REINSPECTION REPORT

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Nonfriable)	4. ASSESSMENT a. No Change	b. Condition Code	c. Comments	5. RESPONSE ACTION Description	Begin/End Dates
Main Mechanical Room – Closet	**HGA-03**	**X**	**MIS-F-Sheetrock Mud**		**5**	**Room in good condition; Recommend O&M**	**O&M**	**I&O**
Gym Crawlspace	**HGA-04**		**TSI-F-Pipe Insulation**		**1**	**Deterioration due to age of material. Some material is on the ground. Recommend Removal by Summer of 2006**	**Isolate**	**I&O**

INSPECTOR: Typed Name: Bill Blackheart Signature: _____

NC Accreditation Number: 115252 Date: 6/1/01

LEA DESIGNEE: Typed Name: John R. Doe

Date: 8/15/01 Signature: _____

MANAGEMENT PLANNER: Typed Name: Joan Jett Signature: _____

NC Accreditation Number: 200132 Date: 6/1/01

PHOTO COPYING PERMITTED

BAD EXAMPLE

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

BAD EXAMPLE

AHERA REINSPECTION REPORT

LEA/System #: Hershy County Schools /123

School Name and No: Hershy Elementary /111

Building(s): Gym / Boys Locker Room

School Address: 135 Main Street, Hershy, NC 27713

Reinspection Date: June 1, 2001

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Nonfriable)	4. ASSESSMENT a. No Change	4. ASSESSMENT b. Condition Code	4. ASSESSMENT c. Comments	5. RESPONSE ACTION Description	5. RESPONSE ACTION Begin/End Dates
Gym / Attic Space	**HGA-05**		**TSI -N- Elbows**	**X**		**Could Not Reach Attic Entrance. Recommend O&M**	**O&M**	**I&O**
Gym / Boys' Locker Room	**HGA-06**		**SUR -N- Ceiling Skim Coat**	**X**		**Partial abatement in hallway only- Abated summer of 1994. 50% of material remains in good condition.**	**Abated**	**6/1/94- 6/30/94**

INSPECTOR: Typed Name: Bill Blackheart Signature:

NC Accreditation Number: 115252 Date: 6/1/01

LEA DESIGNEE: Typed Name: John R. Doe

Date: 8/15/01 Signature:

MANAGEMENT PLANNER: Typed Name: Joan Jett Signature:

NC Accreditation Number: 200132 Date: 6/1/01

PHOTO COPYING PERMITTED

BAD EXAMPLE

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

BAD EXAMPLE

AHERA REINSPECTION REPORT

LEA/System #: Hershy County Schools /123
School Name and No: Hershy Elementary /111
Building(s): Cafeteria / Kitchen
School Address: 135 Main Street, Hershy, NC 27713
Reinspection Date: June 1, 1998

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Nonfriable)	4. ASSESSMENT a. No Change	4. ASSESSMENT b. Condition Code	4. ASSESSMENT c. Comments	5. RESPONSE ACTION Description	5. RESPONSE ACTION Begin/End Dates
Cafeteria / Dining Room	**HGA-07**		**MIS-F-Ceiling Tile Original Code A**	**X**		**Maintain under O&M**	**O&M**	**I&O**
Cafeteria / Kitchen	**HGA-07**		**MIS-F-Ceiling Tile Original Code 4**			**Material Abated**	**Abated**	**Summer June 1 – June 31, 1995**

INSPECTOR: Typed Name: Bill Blackheart Signature:
NC Accreditation Number: 115252 Date: 6/1/01

LEA DESIGNEE: Typed Name: John R. Doe
Date: 8/15/01 Signature:

MANAGEMENT PLANNER: Typed Name: Joan Jett Signature:
NC Accreditation Number: 200132 Date: 6/1/01

PHOTO COPYING PERMITTED

BAD EXAMPLE

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

BAD EXAMPLE

AHERA REINSPECTION REPORT

LEA/System #: Hershy County Schools /123
School Name and No: Hershy Elementary /111
Building(s): Storage / Old Field House
School Address: 135 Main Street, Hershy NC 27713
Reinspection Date: June 1, 2001

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Nonfriable)	4. ASSESSMENT a. No Change	4. ASSESSMENT b. Condition Code	4. ASSESSMENT c. Comments	5. RESPONSE ACTION Description	5. RESPONSE ACTION Begin/End Dates
Storage Building	**HGA-08**		**TSI-N Pipe Insulation**	**X**		**Building has been Abandoned 7/1/95**		
Old Field House	**HGA_09**		**TSI -N Pipe Insulation**	**X**		**Used for Storage**		

INSPECTOR: Typed Name: Bill Blackheart Signature: _____
NC Accreditation Number: 115252 Date: 6/1/01

LEA DESIGNEE: Typed Name: John R. Doe
Date: 8/15/01 Signature: _____

MANAGEMENT PLANNER: Typed Name: Joan Jett Signature: _____
NC Accreditation Number: 200132 Date: 6/1/01

PHOTO COPYING PERMITTED

BAD EXAMPLE

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

BAD EXAMPLE

AHERA REINSPECTION REPORT

LEA/System #: Hershy County Schools /123
School Name and No: Hershy Elementary /111
Building(s): Boiler Room
School Address: 135 Main Street, Hershy, NC 27713
Reinspection Date: June 1, 2001

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Nonfriable)	4. ASSESSMENT			5. RESPONSE ACTION	
				a. No Change	b. Condition Code	c. Comments	Description	Begin/End Dates
Boiler Room	**HGA-10**		**SUR -F-Sprayed on Fire Proofing**		**2**	**Vibration Damage, Visible Material on Floor- Removal Recommended.**	**Repair**	**9/1 – 10/15/21**
							O&M	**I&O**
Boiler Room	**HGA -11**		**TSI-F Boiler Jacket**		**1**	**Deterioration of Boiler Jacket**	**Remove**	**8/1- 8/15/2025**

INSPECTOR: Typed Name: Bill Blackheart Signature:
NC Accreditation Number: 115252 Date: 6/1/01

LEA DESIGNEE: Typed Name: John R. Doe
Date: 8/15/01 Signature:

MANAGEMENT PLANNER: Typed Name: Joan Jett Signature:
NC Accreditation Number: 200132 Date: 6/1/01

PHOTO COPYING PERMITTED

BAD EXAMPLE

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY BRANCH
HEALTH HAZARDS CONTROL UNIT

BAD EXAMPLE

AHERA REINSPECTION REPORT

LEA/System #: Hershy County Schools /123
School Name and No: Hershy Elementary /111
Building(s): Library
School Address: 135 Main Street, Hershy, NC 27713
Reinspection Date: June 1, 2001

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Nonfriable)	4. ASSESSMENT a. No Change	4. ASSESSMENT b. Condition Code	4. ASSESSMENT c. Comments	5. RESPONSE ACTION Description	5. RESPONSE ACTION Begin/End Dates
Library	**HGA-12**		**MIS-F-Ceiling Tile Original Code 4**		**5**	**Good Condition**	**O&M**	**I&O**

INSPECTOR: Typed Name: Bill Blackheart Signature:
NC Accreditation Number: 115252 Date: 6/1/01

LEA DESIGNEE: Typed Name: John R. Doe
Date: 8/15/01 Signature:

MANAGEMENT PLANNER: Typed Name: Joan Jett Signature:
NC Accreditation Number: 200132 Date: 6/1/01

PHOTO COPYING PERMITTED

BAD EXAMPLE

NOTE: This document was scanned from the original and has been carefully checked for errors. Formatting was changed slightly to keep answers and questions together. Therefore there are some blank pages that are marked as "This page intentionally left blank".

100 COMMONLY ASKED QUESTIONS

ABOUT THE

NEW AHERA ASBESTOS-IN-SCHOOLS RULE

Introduction

This is a collection of questions commonly asked about the new Asbestos-Containing materials in Schools rule, promulgated by the U.S. Environmental Protection Agency in October 1987 under the Asbestos Hazard Emergency Response Act (AHERA) of 1986.

Many questions are answered directly and completely, as they are clearly addressed by provisions of the rule. Other questions, however, must be answered more generally, for the Agency's response to the question may change depending upon the specific circumstances in a particular school. Schools, of course, may also be subject to State or local asbestos management and abatement requirements, not reflected in this document.

This "100 Commonly Asked Questions" document is offered as a guide to help school officials, training providers and accredited persons better understand the new AHERA schools rule. If you have further questions, please contact the EPA Regional Asbestos Coordinator who serves your area or call the EPA Toxics Hotline in Washington, D.C., at 202/554-1404.

Office of Toxic Substances
Office of Pesticides and Toxic Substances
U.S. Environmental Protection Agency
Washington, D.C. 20460
May 1988

100 Commonly Asked Questions About the New

AHERA Asbestos-in-Schools Rule

Table of Contents

I.	Effective Dates	1
II.	Buildings Covered by the Rule	6
III.	General LEA Responsibilities	12
IV.	Inspections, Reinspections, and Periodic Surveillance	16
V.	Exclusions	25
VI.	Response Actions	26
VII.	Operations and Maintenance **(O&M)**	29
VIII	Custodial and Maintenance Worker Training	32
IX.	Management Plans	35
X.	Recordkeeping	42
XI.	Accreditation	43
XII.	TEM, PCM, Sampling and Analysis	50
XIII.	Warning Labels	56
XIV.	Transport and Disposal	58
XV.	State Waivers	59
XVI.	Miscellaneous	60

ACRONYMS USED IN THIS GUIDE

ACBM	Asbestos-containing Building Materials
ACM	Asbestos-containing Materials
AHERA	Asbestos Hazard Emergency Response Act
LEA	Local Education Agency
NESHAP	National Emission Standards for Hazardous Air Pollutants
O&M	Operations and Maintenance
PCM	Phase Contrast Microscopy
TEM	Transmission Electron Microscopy

I. EFFECTIVE DATES

Questions 1-7

On what date does each of the following requirements become effective?

— the management plan

— specific O&M work practices

— O & M training

— periodic surveillance

— warning labels

— selection of an LEA's Designated Person

— management plan availability for public review

Answers:

— The Management Plan--The effective date of the management plan is the date on which the LEA begins to implement its plan. According to AHERA § 203(i), this can be no later than July 9, 1989.

— O&M Work Practices--After December 14, 1987, LEAs must abide by the operations and maintenance requirements in § 763.91, whenever any of these activities need to be performed.

— O &M Training--(i) The 14-hour training requirement (see section 763.92(a)(2)) is for specific members of the custodial and maintenance staff who conduct activities that may disturb ACBM. After December 14, 1987, only custodial and maintenance staff who have had the 14-hour training are permitted to conduct such activities.

(ii)--The effective date for the 2-hour general awareness training is defined in the rule. Section 763.92 (a)(1) states that the LEA shall

ensure, prior to the implementation of the operations and maintenance provisions of the management plan (emphasis added), that all members of its maintenance and custodial staff who may work in a building that contains ACBM receive awareness training of at least 2 hours." As outlined in the rule, therefore, all members of the custodial and maintenance staff must have awareness training on or before July 9, 1989.

— Periodic Surveillance--In § 763.92(b)(1), the rule states that "... at least once every 6 months-after a management plan is in effect, each LEA shall conduct periodic surveillance…" in its buildings. Thus if a management plan was put into effect on July 9, 1989, for example, the LEA would have to conduct its first periodic surveillance by January 9, 1990.

— Warning Labels--Section 763.95(a) states that the LEA "... shall attach a warning label immediately adjacent to any friable and nonfriable ..." ACBM found in routine maintenance areas. As a result, if ACBM is identified in routine maintenance areas, the material must be labeled as soon as possible thereafter. (For material identified under the 1982 rule, these materials should have been labeled as of December 14, 1987.) After the results of the inspections conducted pursuant to the 1987 schools rule are known, all ACBM identified in routine maintenance areas must be labeled.

— Selection of an LEA's Designated Person--Section763.84 requires that LEAs designate a person to ensure that the actions of persons who conduct a variety of activities, including O&M,

inspections and response actions, are carried out in accordance with the rule. As a result, LEAs must select a Designated Person as soon as possible to ensure these activities are done properly.

— Management Plan Availability for Public Review--

Section 763.93(g)(1) states that "... upon submission of a management plan to the Governor for review, a local education agency shall keep a copy of the plan in its administrative office." This means that the LEA must have the plan available for public review (including parents and staff) in its administrative office on the day on which it is submitted. Each individual school shall have a copy of the school's plan available on the same day.

Question 8: When must LEAs take certain response actions for areas of significantly damaged surfacing ACM and damaged or significantly damaged thermal system insulation ACM?

Answer: Several conditions listed in § 763.90 necessitate a quick response. For example, a room with significantly damaged friable surfacing ACM must be immediately isolated and access to it restricted, if these measures are needed to protect human health and the environment. In addition, damaged or significantly damaged thermal system insulation must be at least repaired and then maintained by the LEA in an intact state and undamaged condition. As a result, as soon as a management planner and LEA determine that these conditions exist, the LEA must initiate steps to take action. The LEA cannot wait until July 9, 1989 to address these hazards.

Question 9: The AHERA statute requires schools to begin implementing the management plan by July 9, 1989. Exactly what must be begun by this date?

Answer: July 9, 1989, is the latest date on which any LEA can begin to implement its management plan. The formal operations and maintenance plan designed for a particular school (for example, a routine cleaning schedule for that school), and the response action schedule with completion dates, must be implemented no later than July 9, 1989. A schedule for an abatement project, for example, will become effective on July 9, 1989, even though the project is

not scheduled until later. In addition, the July 9, 1989, date is the latest date on which schools can begin their periodic surveillance and reinspection intervals. In other words, periodic surveillance must be performed within 6 months of July 9 if a school to implement its management plan on this date.

II. BUILDINGS COVERED BY THE RULE

Question 10: A school district leases space from a nonschool group (corporation, YMCA, etc.). Who is responsible, the school district or the landlord for complying with the AHERA rule?

Answer: The LEA is responsible for complying with the rule. There are several references to school buildings under the authority of an LEA in AHERA (see sections 203(b),(c),(d), (e),(f) and (i)). This phrase clearly covers buildings owned by the LEA. It also includes buildings leased by LEAS since LEAS control access to these buildings, how these buildings are used by occupants (e.g., classes in certain rooms, administrative offices in others), the furnishings within the buildings, and the scheduling of school-related activities. As a result, an LEA which leases a school building exercises authority with respect to the use of the building as a school. Section 763.85(a) of the rule states that leased school buildings are covered and that the LEA is responsible.

Question 11: If an LEA owns a building but does not currently use it as a school, must it be inspected by October 12, 1988? (For example, what if changes in school population have forced a school district to close a school and to rent the building out to a religious group for services?)

Answer: The LEA doesn't have to inspect such a building by October 12, 1988. However, § 763.85(a)(1) indicates that LEAs shall inspect each school building that they lease, own, or otherwise use. As a result, before an LEA decides to use a building already leased or owned as a school building, the LEA must first inspect the building.

In addition, § 763.93(a)(3) states, "If a local education agency begins to use a building as a school after October 12, 1988, the local education agency shall submit a management plan for the school [to the State] prior to its use as a school."

Question 12: If an LEA obtains a building in April of 1990, for example, how soon must the LEA inspect it?

Answer: Section 763.85(a)(2) addresses this issue. "Any building leased or acquired on or after October 12, 1988, that is to be used as a school building, shall be inspected as described in (a)(3) and (4) of this section prior to its use as a school building."

Question 13: A school building burns down. An LEA wants to use a local community center for 6 months due to the emergency. Does this temporary school building have to be inspected?

Answer: Section 763.85(a)(2) states that, "In the event that emergency use of an uninspected building as a school building is necessitated, such buildings shall be inspected within 30 days after commencement of such use."

Question 14: Will for profit schools be required to comply with the EPA rule?

Answer: No. Section 202(7) of AHERA specifically refers only to non-profit schools. As a result, schools operated on a for profit basis are not covered.

Question 15: Are State-run schools (e.g., prison schools, schools for the handicapped, etc.) covered by AHERA?

Answer: That usually depends on State law. AHERA section 202 states that "... the term 'school' means any elementary or secondary school as defined in section 198 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2854)." The definition to which this refers states: "the term 'elementary school' means a day or residential school which provides elementary education, as determined under State law, and the term secondary school means a day or residential school which provides secondary education, as determined under State law, except that it does not include any education provided beyond grade 12..." (20 U.S.C. 2854) Thus, individual State law addresses whether a State-run school is covered as an elementary or secondary school.

Question 16:	Several high school students take advanced placement classes with college freshmen at the State University. Does a classroom or building that these students frequent have to be inspected?
Answer:	No. AHERA § 203 refers to school buildings under the authority of an LEA. These classrooms are not under an LEA's authority, and therefore are not covered.
Question 17:	Each year the local high school has its annual play at a local Community center. Rehearsals and the actual shows run for over 2 months. Is this building covered?
Answer:	If the local community center is not under the authority of the LEA, This building is not covered.
Question 18:	Are churches or sanctuaries that are under the LEA's authority, which are attended by students for religious purposes during normal school hours, required to be inspected?
Answer:	No. However, if a church is under the authority of an LEA and is used for other school instruction (e.g., math, spelling, etc.) as part of the school's curriculum, then it must be inspected and included in the management plan.

Question 19: Are the school district's administrative offices (such as the Board of Education or the Superintendent's Office) covered by AHERA, even if students never attend classes in these buildings?

Answer: Yes. Among the structures covered in the definition of "school building" in AHERA (section 202) and the rule (section 763.83) would be any other facility used for the instruction or housing of students or for the administration of educational or research programs (emphasis added)."

Question 20; Are the school system's maintenance or storage facilities (e.g., bus garage or warehouse) covered by the rule?

Answer: In general, the answer is yes. Section 202 of AHERA and section 763.83 of the rule define "school building" to include "... 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)." Paragraphs (1), (2), and (3) cover classrooms, libraries, gymnasiums, and administrative offices. For purposes of the rule, the facility is deemed essential if the LEA uses the facility. Vacant facilities of this type (i.e., empty storage facilities, empty warehouses, etc.) are not deemed essential, and therefore are exempt, because they are not used. Once the LEA begins to use these facilities, however, they become essential and must be addressed as required by the rule.

Question 21: An LEA has a school building which is no longer being used and is scheduled for demolition. Is the LEA required to have an accredited contractor and workers do the abatement work which is required under NESHAPS?

Answer: Not under AHERA, although individual States or localities may have other statutes. A building that is abandoned and scheduled for demolition is not covered by AHERA since the building is no longer being used as a school.

Question 22: Several LEAs bus students to bowling alleys or YMCA swimming pools and gymnasiums for physical education classes. Must LEAs inspect these buildings?

Answer: No. These buildings are not covered by the rule.

Question 23: A school uses a single room in a nonschool building on a regular basis as a classroom for elementary and secondary education purposes during regular school hours. Is the room covered by the rule? Is the entire building also covered?

Answer: The single room used by the school on a regular basis as a classroom is covered by the rule. The rest of the building is not covered.

III. GENERAL LEA RESPONSIBILITIES

Question 24: Sections 763.84(g)(2) and 763.93(e)(3)(4) refer to, The"... trained person designated by the LEA to implement the management plan…" The Rule does not indicate what specific training course is required to qualify the person(s) responsible for implementing the management plan. Should this person be "accredited" and would it be as a management planner or contractor/supervisor or project designer? What would constitute adequate training?

Answer: The LEA's designated person is not required to be accredited; however, he or she must have some minimal training. Section 763.84(g)(2) lists the training requirements. No specific hours of training were required since a designated person in a small LEA with only nonfriable ACBM may not need to have as much training as the designated person for a large city school system. Section 763.93(e)(4) requires, however, that the LEA list the course name, dates, and hours of training undertaken by the designated person.

Question 25: Can an LEA designate a committee instead of one person to coordinate asbestos programs for an LEA?

Answer: No. Section 763.84(g)(1) requires each LEA to designate "a person". This person or the LEA**,** however, may choose to appoint an advisory committee.

Question 26:	Can a group of LEAs share a Designated Person?
Answer:	Yes.
Question 27:	Must an LEA's Designated Person be an employee of the LEA, or can this person be an outside consultant, available on a part-time basis? Does the Designated Person have to be "on-site" at the LEA, or can he/she be located at another location?
Answer:	The Designated Person does not have to be an LEA employee. Section 763.80(a) allows LEAs to delegate the duties of their Designated Person under the rule, but the LEAs remain responsible for the proper performance of those duties. The Designated Person does not have to be on-site at the LEA.
Question 28:	Many LEAs intend to select certain person(s) who are permanent employees of the district to become accredited inspectors, management planners, project designers, contractor/supervisors and abatement workers. Does EPA foresee any problems with this approach, since S 763.84(h) cautions against "conflict of interest" among accredited personnel?
Answer:	The conflict of interest provision in the rule pertains to outside contractors who serve in two or more capacities. (see rule preamble discussion, p. 41836. LEAs have the option to use their own employees to carry out all tasks.

Question 29: What is the definition of school as contained in Section 198 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2854)?

Answer: The following excerpts include key terms from the 1965 Act. LEAs should contact their appropriate State agency for specifics on State law.

> 20 U.S.C. 3381, Elementary and Secondary Education Act of 1965 (c) The term "elementary school" means a day or residential school which provides elementary education, as determined under State law.
>
> (f) The term "local educational agency" means a public board of education or other public authority legally constituted within a State for either administrative control or direction of, or to perform a service function for, public elementary or secondary schools in a city, county, township, school district, or other political subdivision of a State, or such combination of school districts or counties as are recognized in a State as an administrative agency for its public elementary or secondary schools. The term also includes any other public institution or agency having administrative control and direction of a public elementary or secondary school.

(h) The term "secondary school" means a day or residential school which provides secondary education, as determined under State law, except that it does not include any education provided beyond grade 12.

20 U.S.C. 2854

(7) The term "elementary school" means a day or residential school which provides elementary education, as determined under State law, and the term "secondary school" means a day or residential school which provides secondary education, as determined under State law, except that it does not include any education provided beyond grade 12.

IV. INSPECTIONS, REINSPECTIONS, AND PERIODIC SURVEILLANCE

Question 30: What specifically must be inspected, and what need not be inspected? Where do you draw the line? Determining the location of every material that may contain asbestos may be impossible. Should an inspector tear up the school building (e.g., knock down walls) to find asbestos?

Answer: EPA will require LEAs to ensure that accredited inspectors conduct a thorough and complete inspection. However, in most cases, EPA does not intend that the accredited inspector undertake destructive steps (e.g., tearing down a wall) in an attempt to locate ACBM.

An accredited inspector is expected to take reasonable steps to locate ACBM. Specifically, an accredited inspector is expected to conduct a thorough visual inspection, examine all concealed accessible areas (e.g., above drop ceilings, inside ventilation shafts, etc.) and carefully review building plans and use his or her own knowledge to determine if ACBM was used in areas that are inaccessible. Building plans may provide some helpful information about where to look for ACBM, but they are not a substitute for a thorough inspection.

An accredited inspector must answer two questions with respect to inaccessible areas:

1) Is there reason to suspect that ACBM is present?

2) Is there reason to believe fibers could be released from ACBM and carried from the area?

If the answer to both questions is 'yes", the inaccessible area must be examined. If the answer to question number one is "no", no further action is needed. If the answer to question number one is "yes", but question number two is answered "no", the LEA should inventory the material as assumed ACBM and keep track of the material during periodic surveillance and reinspection.

The second question above is important. A key aspect of most inspector training courses is understanding how the air circulates inside a building. If air circulates through an area that contains asbestos, asbestos fibers could be carried to the rest of the building.

Question 31: Does nonfriable surfacing and miscellaneous ACM have to be assessed? What about thermal system insulation?

Answer: Nonfriable miscellaneous and nonfriable surfacing ACBM do not have to be assessed. However, thermal system insulation with no damage must be assessed if it has potential for damage or potential for significant damage. The definitions of potential damage and potential significant damage in § 763.83 include circumstances under which there is a " reasonable likelihood that the material or its covering (emphasis added)" will

become damaged or significantly damaged. The term "covering" applies to thermal system insulation. Thus, thermal system insulation can be characterized as having potential for damage or potential for significant damage.

In addition, § 763.90(a) states that the LEA " shall select and implement in a timely manner the appropriate response actions in this section consistent with the assessment conducted in § 763.88 (emphasis added)." Therefore, the areas requiring response actions under § 763.90 must be assessed under § 763.88. Section 763.90(e) states that "... if any friable surfacing ACM, thermal system insulation ACM, or friable miscellaneous ACM that has potential for damage is present in a building, the local education agency shall at least implement an operations and maintenance program (emphasis added)." Similarly, thermal system insulation ACM with the potential for significant damage also has response action requirements. Since both § 763.90(e) and (f) list response actions for thermal system insulation with the potential for damage and significant damage, such material must be assessed under § 763.88.

Question 32: Can unaccredited persons under the supervision of an accredited inspector collect samples, and look in crawlspaces and other areas to locate ACBM?

Answer: No. Sections 763.85, 763.86, and 763.88 all specifically require an accredited inspector to conduct the necessary tasks in order to fulfill the inspection and reinspection requirements.

Question 33: Must encapsulated ACBM be reassessed every 3 years?

Answer: During a reinspection, in addition to checking friability, encapsulated ACBM must be closely examined to determine whether the response action has failed. If the response action has failed, the area must be reassessed.

Question 34: A school building includes a "covered exterior hallway or walkway". Does this include both the underside and roof of these areas?

Answer: Only the underside of the hallway or walkway is included.

Question 35: By what date must the reinspection be finished? Is it October 12, 1991, July 9, 1992, or 3 years from the original inspection?

Answer: Section 763.85(b)(1) states that "At least once every 3 years after a management plan is in effect, each local education agency shall conduct a reinspection ..."of each school building. If a management plan became effective on July 9, 1989**,** a reinspection must occur no later than July 9, 1992

Question 36: Can a building inspector use his/her own lab to analyze the bulk samples taken?

Answer: Yes, if the lab has interim EPA or NBS accreditation.

Question 37: Can an LEA just assume that some or all friable and nonfriable suspect material contains ACM rather than taking samples?

Answer: Yes, Sections 763.86(a), (b), (c), and (d) explicitly permit suspect ACBM to be assumed to be ACM.

Question 38: What is "suspect" ACM? Can EPA provide a completed list?

Answer: EPA-approved training courses address what type of materials might contain asbestos. In addition, these courses provide guidance on where thee materials are typically located in buildings.

A complete list of all suspected ACBM would b difficult to compile. However, the following is a partial list of materials that are classified as either suspected ACBM for purposes of the rule, or as materials not covered by the rule. Within the latter category, some materials may contain asbestos, but they are not building materials under the rule and therefore are not included in the AHERA rule. Other materials would not contain any asbestos, or enough asbestos to be defined as ACM under the rule.

Material	Suspected ACBM	Not CoveredBy AHERA Rule
Concrete		x
Cinder block		x
Surfacing materials (e.g., spray applied on trawled-on materials on walls and ceilings)	x	
Blackboards		x
Wall board (material could be gypsum, transit, or other product)	x	
Pressed wood		x
Thermal system insulation	x	
Corrugated-like paper product used for thermal system insulation	x	
Wall or ceiling carpet		x
Gaskets in heating and air conditioning equipment	x	
Floor tile (includes adhesives)	x	
Ceiling tile and panels	x	
Exterior roofing shingles		x, could contain asbestos
Auditorium curtains		x, could contain asbestos
Cement asbestos water pipe	x	
Chemical lab table and desk tops		x, could contain asbestos

Material	Suspected ACBM	Not Covered by AHERA RULE
Fire doors	x	
Fire brick for boilers	x	
Suspected ACBM stored in school		x, could contain asbestos
ACBM cloth adjoining air ducts	x	
Chemical lab gloves		x, could contain asbestos
Fire blanket		x, could contain asbestos
Glass		x
Steel		x
Sheeting in fume hood	x	
Brake shoes		x, could contain asbestos
Kiln bricks and cement		x
Bunsen burner pad		x, could contain asbestos

Question 39: Please define what is meant by the phrase, "any change in condition", as it refers to surveillance?

Answer: A maintenance person conducting periodic surveillance would notice water damage, major delamination, a major fiber release, or even minor damage. For surfacing material, damage might also include separation of ACM from the substrate; flaking, blistering, or crumbling of the ACM surface; and scrapes, gouges,, mars, or other signs of physical injury. Asbestos debris may also indicate damage. For thermal system insulation, damage may include gouges, punctures, water damage, crushed areas and torn or missing coverings. The person conducting periodic surveillance will have to be aware of the materials previous condition, documented in the management plan, in order to determine if any changes in the material's condition has occurred.

Question 40: Should the management planner exercise a quality control function over the inspector's report?

Answer: Section 763.88(d) requires the accredited management planner "to review the results" of inspections, assessments, and reinspections.

V. EXCLUSIONS

Question 41: Can an inspector who received accreditation in 1988 grant an inspection exclusion for all or part of a school he inspected in 1985?

Answer: Yes. The accredited inspector would essentially state that all or part of his previous inspection has met the requirements of the new Rule (see § 763.99). In general, the accredited inspector is the person Who can determine that the LEA is eligible for an exclusion (see? Sections 763.99(a)(1), (2), (3), (5), (6), and (7). However, under § 763.99(a)(7), an architect or engineer can sign a statement that no ACBM was specified for use in the construction of a school built After October 12, 1988.

Under § 763.99 (a)(4), the lead agency in a State that has Received a waiver from V 763.859a) can grant an exclusion.

VI. RESPONSE ACTIONS

Question 42: Is the removal of nonfriable asbestos containing Floor tile considered a response action that requires the use of accredited personnel? If more than 3,000 square feet is removed this summer, must TEM be used for clearance?

Answer: If the floor tile or its adhesive material does not become friable during the removal process, it is not a response action, since the definition of response action refers to a method "that protects human health and the environment from friable ACBM." If the material becomes friable during removal, however, the job is then a response action requiring both accredited personnel and the use of TEM if the area exceeds 3,000 square feet.

Typically, vinyl asbestos floor tile is tightly bound and asbestos is generally not released under normal use. However, during a removal operation, the tile could be rendered friable. In addition, any sanding operations conducted to remove the adhesive beneath the tiles would render the adhesive material friable.

Question 43: Is the installation of carpet over damaged A/V Floor tiles an enclosure?

Answer: No. An enclosure is defined in § 763.83 as "an airtight, impermeable, permanent barrier around ACBM to prevent the release of asbestos fibers into the air." Carpeting is not impermeable, permanent, or airtight.

Question 44: What does the term "timely fashion" mean? How will EPA enforces this?

Answer: On page 41839 of the preamble EPA addresses the "timely fashion" issue:

> However, LEAs should be advised that in providing a schedule for beginning and completing each response action as required in § 763.93(e)(6), the LEA is specifying what constitutes implementation of preventive measures and response actions in a timely fashion for that LEA (emphasis added). EPA and State enforcement officials will be monitoring LEA adherence to these schedules to determine whether enforcement actions are warranted against those schools which fail to meet their own deadlines for completing preventive measures and response actions. In reviewing management plans, States may reject plans if the schedule for response actions is not reasonable and timely (AHERA § 205(c)(1)).

Question 45: If, during a periodic surveillance check, a custodian finds damaged thermal system insulation, what must be done?

Answer: Section 763.90(b) states that "... if damaged or significantly damaged thermal system insulation ACM is present in a building, the local education agency shall:

1) At least repair the damaged area.
2) Remove the damaged material if it is not feasible, due to technological factors, to repair the damage.
3) Maintain all thermal system insulation ACM and its covering in an intact state and undamaged condition."

As a result, the LEA must at least repair the damaged area and make sure that the thermal system insulation is constantly maintained in an intact state and undamaged condition.

Question 46: Is ceiling tile friable or nonfriable? If it is friable, must accredited persons and TEM be used to remove 3,600 square feet of ceiling tile in a cafeteria?

Answer: Like all other materials, the friability of ceiling tile must be determined by hand pressure. If the ceiling tile is friable, and the inspector either assumes ceiling tile is ACM or sampling confirms the presence of ACM, accredited persons and TEM must be used in the example outlined above.

VII. OPERATIONS & MAINTENANCE (O&M)

Question 47: Please define the phrase, "... materials that are about to become friable…"

Answer: If a workman is about to sand nonfriable floor tile that was assumed to be ACBM, this material would shortly become friable. The material would immediately be subject to the O&M requirements found in §763.91.

Question 48: Are there circumstances under which initial cleaning requires the use of an accredited supervisor?

Answer: No. Section 763.91(c)(1) does not require accredited personnel for this task.

Question 49: Must an accredited person develop the O&M plan?

Answer: No. AHERA stipulates that only certain activities require an accredited person. Section 206(a)(3) does not require an accredited person to develop the O&M plan. However, EPA strongly recommends that schools use an accredited management planner to develop the O&M plan to ensure that the plan is consistent with the regulations.

Question 50: O&M covers friable material only. What about nonfriable ACBM with the potential for damage? Does this type of material need to be addressed in an O&M plan?

Answer: Nonfriable surfacing and miscellaneous materials need not be covered by an O&M plan, even if they have potential for damage or significant damage.

However, as stated in § 763.90(e) and (f), thermal system insulation with the potential for damage or significant damage must be covered in an O&M program as described in § 763.91.

Question 51: What is the difference between § 763.91, which addresses operations and maintenance activities, and the O&M plan required in § 763.93?

Answer: The operations and maintenance requirements listed in S 763.91 are in effect for all LEAs whenever specific maintenance activities are conducted or accidents occur. The O&M plan as part of the management plan is a particular control program tailored to each individual school. Section 763.91 describes the procedures which LEAs must carry out for certain O&M activities, such as cleaning, in their buildings after December 14, 1987. An O&M plan in § 763.93 is a specific control program for a particular school building. For example, the O&M plan for a certain school may include a monthly schedule for routine cleaning, and may also include specific requirements of how to prevent fiber release from ACBM within the school building. (The procedures for such a plan are provided in § 763.91.) The O&M plan for a particular school may also include a permit system to exercise control over work conducted in the school that could disturb ACBM. The O&M plan must be implemented as part of the school's management plan no later than July 9, 1989.

VIII. CUSTODIAL AND MAINTENANCE WORKER TRAINING

Question 52: a) Will any of the custodial and maintenance worker personnel who have received previous training be "grandfathered" in?

b) If so, what criteria will these workers have to meet, and what will be the process for making the determination?

Answer: a) Custodial and maintenance personnel may be “grandfathered". Section 763.92(a)(3) states that “...local education agency maintenance and custodial staff who have attended EPA-approved asbestos training or who received equivalent training for O&M and periodic surveillance activities involving asbestos shall be considered trained for purposes of this section."

b)In making this determination, LEAs will need to determine if previous training adequately covered the topics required in §§ 763.92(a)(1) and (2). Equivalent training in this case means comparable training; it need not be exactly the same. Obviously a training course taken in 1985 could not have covered the AHERA statute or regulation, or the OSHA standard. Previous instruction, however, must have covered the following key items: information on health effects; how to recognize ACBM and damaged ACBM; and, for staff who may disturb ACBM, information on handling ACBM, use of respirators and hands-on training. Additionally, EPA recommends that individuals who have received equivalent training in the past receive information on AHERA.

Question 53:	What are the qualifications or exact training needed by an individual who conducts the 2-hour awareness training and the 14-hour additional training for the maintenance and/or custodial employees?
Answer:	The regulation does not require specific qualifications for instructors who perform O&M training. LEAs should, however, select instructors with a professional or educational background in the asbestos field.
Question 54:	Does EPA plan to develop a "canned" training program for the 2-hour training course required for custodial and maintenance workers under § 763.92?
Answer:	With EPA funding, the National Asbestos Council and the American Association of School Administrators (AASA) have worked jointly to develop a videotape and instructor's manual that generally cover the requirements for the 2-hour awareness training for custodial and maintenance staff. One of EPA's funded training centers, Temple University, is also developing an awareness video. As required by the rule, custodial and maintenance staff must also receive site-specific training (e.g., location of ACBM in their building). LEAs interested in the AASA videotape should contact AASA at (703) 875-0723 for details.

Question 55**:**	Sections 763.92(a)(1) and (2) refer to 2-hour training and 14-hour training. If an LEA's workers have not taken the 3-day course to become "accredited" abatement workers, and the LEA decides to have workers receive the 2-hour and 14-hour training, where should the workers go for the abbreviated training? How is this training documented?
Answer:	EPA anticipates that LEAs will use a variety of resources to train custodial staff. Private consultants, LEA staff, local colleges and labor groups are potential sources of instructors for O&M training. Section 763.94(c) requires LEAs to keep specific information on O&M training, including the location of the training and the number of hours of training.

IX. MANAGEMENT PLANS

Question 56: Under what circumstances can a State disapprove a management plan? Is an LEA required to accept changes recommended by the State?

Answer: Section 205(c)(1) of AHERA states

> … the Governor may disapprove a management plan within 90 days after the date of receipt of the plan if the plan:
> (A) does not conform with the regulations under § 203 (i) (or with § 204(d) if there are no regulations),
> (B) does not assure that contractors who are accredited pursuant to this title will be used to carry out the plan, or
> (C) does not contain a response action schedule which is reasonable and timely, taking into account circumstances relevant to the speed at which the friable ACM in the school buildings under the local education agency authority should be responded to, including human exposure to the asbestos while the friable ACM remains in the school building, and the ability of the local education agency to continue to provide educational services to the community.

According to § 205(c)(2) of AHERA, "if the State Governor disapproves a plan, the State Governor shall explain in writing to the LEA the reasons why

the plan was disapproved and the changes that need to be made in the plan. Within 30 days after the date on which notice is received of disapproval of its plan, the LEA shall revise the plan to conform with the State Governor's suggested changes (emphasis added). The Governor may extend the 30 day period for not more than 90 days."

The LEA, therefore, must revise its plan to conform with changes specified by the State in conformance with § 205(c)(1). If the LEA's plan does not conform with the State's modified plan, the school is in violation of AHERA.

Question 57: An LEA has to develop an asbestos management plan for each school. Does this mean an LEA has to have a separate management plan for each of its schools, or can it have one large plan that covers all of its schools?

Answer: LEAs must have a separate management plan for each school, according to § 763.93(a)(1). In addition, § 763.93(g)(3) states, "Each school (emphasis added) shall maintain in its administrative office a complete, updated copy of the management plan for that school." To clarify further, this does not mean that each building on a school's campus needs the management plan, just the administrative office for that school.

Question 58: After October 12, 1988, under what circumstances will LEAs have to submit a revised management plan to the State for review?

Answer: Sections 763.93(a)(2) and (3) require LEAs to submit management plans to their States for school buildings leased, otherwise acquired, or used as school buildings after October 12, 1988. This requirement is for buildings added to the plan.

Question 59: Must LEAs notify their State when they update their management plans after a reinspection?

Answer: No. The rule does not require LEAs to notify their State when they update the management plan as a result of a reinspection. This pertains to buildings already in the management plan. However, through their own regulations, States may require LEAs to notify the appropriate State agency when plans are updated as a result of a reinspection.

Question 60: When must the LEA initially notify parent, teacher, and employee groups in writing about the availability of the management plan?

Answer: Section 763.93(g)(4) requires LEAs to notify in writing parent, teacher, and employee organizations of the availability of the management plan when the management plan is submitted to the Governor (State designee) and at least once each school year.

Question 61: If the LEAs have been inspected by an accredited inspector, samples have been taken and analyzed, and no asbestos-containing material has been found, must the district still develop a management plan? At what point is it not necessary to develop a plan?

Answer: The answer to the first part of this question is yes. Section 763.93(e) requires the results of the inspection to be reported in the management plan. With respect to the second part of the question, all LEAS, even a school built after October 12, 1988, with an exclusion based on an architect's statement that no ACBM was used in construction (see § 763.99(a)(7)), must have a management plan. In this case, the management plan would simply include the architect's statement and the notification to parents, teachers, and employees regarding the availability of the plan.

Question 62: If, in 5 years, an LEA has all ACM removed from a school building, does the annual written notification requirement regarding the management plan availability and asbestos-related activities still apply?

Answer: The annual written notification to parents, teachers, and other school employees remains in effect even if a school indicates it has removed all ACM. The purpose of the availability of the management plan is to enable the public to determine if the LEA has implemented the management plan satisfactorily.

Question 63:	Are the LEAs required to keep and/or maintain their management plan for any specified length of time?
Answer:	The rule does not specify a date after which LEAs no longer need a management plan. As a result, LEAs should plan to keep their management plans indefinitely. Certain records, however, can be discarded within a certain period of time after the ACBM has been removed (see § 763.94).
Question 64:	Section 763.93(f) states that the LEA "may" require a statement signed by an accredited management planner that the plan is in compliance with the Rule, but that this statement may not be signed by the person responsible for implementing the plan (even though he/she may be an accredited management planner). Why is the plan implementor prohibited from signing this statement?
Answer:	Section 763.93(f) comes directly from the statute § 203(i)). However, as noted in the actual language, such a statement is not required. The purpose of this prohibition is to discourage conflict of interest between the management plan preparer and an abatement contractor. For LEAs with a concern about conflict of interest between the management planner and the abatement contractor, or about the adequacy of the plan, such a statement should be considered.

Question 65: What forms of written public notifications are acceptable? If no specific organizations exist for the LEA to address, what constitutes acceptable written notification?

Answer: LEAs have a great deal of flexibility with respect to methods of notifying parents, teachers, and employees. However, § 763.93(g)(4) requires LEAs to keep a copy of the notification. A letter to the PTA and the employees' union is acceptable.

In the absence of such formal organizations, the LEA must still notify parents, teachers, and employees in writing. As stated on page 41841 of the rule's preamble, in some instances this notification could take the form of a newspaper advertisement, an article in an LEA newsletter, or some other form. The Agency will further examine these methods of notification on a case-by-case basis. LEAs unsure about how to properly notify these groups should contact their Regional Asbestos Coordinator.

Please note, under S 763-93(g)(4), LEAs must include in the management plan a description of the steps taken to notify such organizations, and maintain a dated copy of the notification.

X. RECORDKEEPING

Question 66: How should the periodic surveillance results be documented? How detailed does the information have to be and what constitutes adequate records?

Answer: Section 763.94(d) requires LEAs to "... record the name of each person performing periodic surveillance, the date of the surveillance, and any changes in the conditions of the materials." A one-page checklist (i.e., change/no change) with sufficient room for comments by the person conducting the surveillance would be adequate. if changes are noticed, the comments must describe each change clearly.

XI. ACCREDITATION

Question 67: Does a person have to take the training course and exam from the same sponsor for accreditation?

Answer: AHERA sections 206(b)(1) and (c)(1) indicate that persons seeking accreditation need to take a training course and pass an examination. For full accreditation through an EPA-approved course, persons must take the course and exam from the same training course sponsor. States that have accreditation programs may require persons seeking accreditation to pass a State-administered exam. Section 206(c)(1) of AHERA states that "... the Administrator shall ensure that any EPA-approved training course is consistent with the model plan (including testing requirements) developed under subsection (b). A contractor may be accredited by taking and passing such a course."

Question 68: If an individual took a course at an EPA training center after January 1, 1985, and was "grandfathered in" as having taken an approved course, when does this person have to take a course to become fully accredited? When is the first refresher course required?

Answer: Persons who are "grandfathered in" after January 1, 1985, do not have to take a course to become fully accredited until one year after their State has or was required to have an accreditation plan approved by EPA, and do not have to take the first refresher

course until 2 years after their State has or was required to have an accreditation plan approved by EPA. For example, a State legislature convenes in January 1988. By July 1988, the State must have developed an accreditation program that meets the Model Plan. Contractors, inspectors, management planners, workers, supervisors and abatement project designers in that State have one year to become fully accredited (i.e., July 1989). The first refresher training would be required by July 1990. These dates are still in effect for individuals even if the State fails to act, in which event, they would complete EPA-approved courses at the specified intervals.

Question 69: What is the time frame for accredited individuals to take the required refresher training course? For example, are they required to take the refresher course prior to the expiration of their accreditation, or 60 days after? If they do not take the refresher course prior to expiration or some subsequent date including a grace period, will they be required to take another full training course and pass the required examination before they can be reaccredited?

Answer: Individuals must take an annual refresher course to maintain their accreditation, as specified in the answer to Question 68. In the

example cited above, if a person fails to take the refresher course within the 1-year prescribed period, their accreditation ceases. As a result, those persons cannot conduct AHERA work in their pertinent discipline. They will have 12 more months to take the refresher course in order to resume conducting AHERA work. If a refresher course is not taken during that period (i.e., within 24 months after accreditation), the entire training course (e.g., 4 days for supervisors) must be repeated and the exam passed.

Question 70: When would a conflict of interest exist among accredited personnel?

Answer: A conflict of interest with respect to accredited personnel would exist if, for example, the management planner and abatement contractor worked for the same firm. The planner might recommend to the LEA more expensive response actions than are necessary in the management plan.

Question 71: May a person serve as an accredited inspector and management planner on the same school project?

Answer: Yes. EPA anticipates that many LEAs will have the same person conduct both tasks. However, LEAs must still evaluate whether that person has a conflict of interest (see section 763.84(h)).

Question 72: Can an LEA hire one abatement firm both to conduct a response action and to carry out the TEM clearance air monitoring on that project?

Answer: No. In Appendix A on page 41858 of the rule under "Sampling", it states that TEM "... sampling operations must be performed by qualified individuals completely independent of the abatement contractor to avoid possible conflict of interest." The LEA would have to select another person or firm "completely independent" of the abatement contractor to do this work. The abatement firm would not be allowed to subcontract this work since the subcontractor is not "completely independent" of the contractor.

Question 73: Can an LEA itself become approved as a training center?

Answer: Yes.

Question 74: How can an LEA find accredited personnel to perform inspections, develop management plans, and conduct response actions?

Answer: In States with EPA-approved programs, the LEA should contact the appropriate State agency responsible for accreditation. In States without approved programs, LEAs may communicate with the contacts from EPA-approved courses and request a list of accredited individuals. LEAs also have the option of hiring

accredited personnel from a State with an EPA-approved program. of course, LEAs may also choose to solicit proposals to conduct inspections, management plans and response actions in newspapers, professional or trade journals. The requirement that persons must be accredited should be emphasized in the LEA's description of the project. Two national organizations, the National Asbestos Council and the National Insulation Contractors Association, have or are in the process of developing lists of their members who have accreditation credentials. Finally, LEAs may have their own personnel trained and accredited through EPA-approved courses or State programs.

Question 75: Must an individual respirator fit test be given to each and every training course participant? Many training providers are concerned about their liability. Shouldn't the student be required to furnish a doctor's statement that indicates the student can safely wear a respirator?

Answer: Training entities must provide students with the opportunity for respirator fit testing. If a student declines to be fit-tested, that is his or her prerogative. In addition, a training entity may require the student to furnish medical evidence that he or she is capable of wearing a respirator. Therefore, if a student has a medical statement from a physician indicating that he or she can be fit-tested, and the student wants to be fit-tested, the training entity must fit-test the student.

Question 76:	Must an accredited designer be used to design a response action?
Answer:	Section 763.90(g) requires that "Response actions including removal, encapsulation, enclosure or repair, other than small-scale, short-duration repairs, shall be designed and conducted by persons accredited to design and conduct response actions (emphasis added)." An accredited designer, then, must develop the job specifications for a response action.
Question 77:	If an abatement designer takes the course for contractors and supervisors, and his/her certificate says "contractor/supervisor", how can the individual prove that he/she is qualified to design abatement projects?
Answer:	The designer should show the LEA the relevant section of the Model Accreditation Plan that enables a person who has successfully completed the contractor/supervisor course to be accredited as a designer (see plan page 15878, "Abatement Project Designers").

Question 78:	Where does it say in the AHERA rule that LEAs must use accredited workers and supervisors to conduct asbestos abatement work after December 14, 1987?
Answer:	Section 763.90(g) requires response actions to be designed and conducted by persons accredited to design and conduct response actions. on page 41826, under the heading "Dates", it states that ... rule shall be effective on December 14, 1987 the "... rule shall be effective on December 14**,** 1987." As a result, the requirement to use accredited personnel under AHERA is in effect as of December 14, 1987. Any asbestos-related work requiring accreditation conducted after that date or must use accredited persons.

XII. TEM, PCM, SAMPLING AND ANALYSIS

Question 79: With respect to TEM, what does the term "contiguous portions" mean?

Answer: The intent of S 763.90(i)(8) is to prevent an LEA from artificially dividing up a large project so as to avoid the TEM requirement. For example, an LEA that has a 3,300 square foot gymnasium cannot artificially divide the gym into 3 separate areas of 1,100 square feet, and then conduct separate abatement in each area, clearing each area by PCM. These areas are obviously contiguous, thus TEM is required.

However, an abatement job in wing A of a building that totals 1,700 square feet and a job in a separate, non-contiguous wing that totals 1,500 square feet are not contiguous portions of material.

Question 80: If an LEA plans to remove 3,500 square feet of ACBM from six adjacent classrooms joined by a hallway, does TEM have to be used for clearance of the entire area or can the LEA choose to remove the ACBM from each classroom separately and use PCM to clear each separate room?

Answer: TEM must be used unless clear engineering reasons exist for dividing such a project into smaller areas. A primary reason EPA permitted the use of PCM for the 3-year phase-in period was to enable an LEA to minimize its total abatement expenses for a small project (e.g., less than 3,000 square feet). For one small project, EPA believes the additional cost of TEM analysis at current prices could greatly increase the total cost of the project.

However, permitting an LEA to subdivide what would normally be one large project into several smaller projects defeats the purpose of the TEM requirement. As necessary, EPA will review such situations on a case-by-case basis.

Question 81: What is meant by the phase "at approximately the same time" (in § 763.90(i)(8)) as it relates to TEM clearance?

Answer: The intent of §763.90(i)(8) is to prevent an LEA from avoiding the TEM requirement by either artificially dividing up a larger project, or by removing ACBM in stages over the course of a relatively short period of time from what normally would have been one large Project if the TEM phase in did not exist. For example, if an LEA removed 1,600 square feet of surfacing ACBM in June 1988, and 1,600 square feet of adjacent surfacing ACBM a few weeks later, EPA would consider this to be removing contiguous portions of ACBM at approximately the same time". As necessary, EPA will review such situations on a case-by-case basis.

Question 82: Would surfacing ACBM on ceilings of two classrooms on two separate floors be viewed as contiguous areas?

Answer: No. Even if one classroom was directly beneath the other-classroom, these would not be contiguous areas under the rule. Each floor would normally have its own containment barrier.

Question 83: With regard to TEM, is there a plan to establish a certain number of air samples to be collected for abatement project clearance based on square footage/area or cubic footage/ volume?

Answer: No. As stated in Appendix A, the minimum number of TEM samples that need to be collected for each test site is 13 samples. These break down as follows:

— 5 samples per abatement area

— 5 samples per ambient area positioned at locations representative of the air entering the abatement site

— two field blanks

— one sealed blank

Not all of these samples will have to be analyzed, in certain cases.

Question 84: Are there criteria for doing aggressive air monitoring?

Answer: Yes. Unit III.B.7.d. of Appendix A in the rule provides criteria for aggressive air monitoring.

Question 85:	Please define the term "nonfriable suspected ACBM." Also, what does the term "manner sufficient to determine" mean with respect to sampling such material?
Answer:	Nonfriable suspected ACBM could be wallboard or floor tile. "Manner sufficient to determine" means the accredited inspector must take an appropriate number of samples for that material. For example, a number of training courses recommend that an inspector take the same number of samples for materials like floor and ceiling tiles as the inspector would for surfacing material. Other training courses suggest that three samples should be taken from homogeneous areas of such material.
Question 86:	Please clarify the use of the term, "homogeneous area", which has a regulatory definition of being uniform in color or texture, when applied to thermal system insulation having pipe lagging that has either been discolored or applied differently to give the appearance of possessing a different texture.
Answer:	The accredited inspector must make a judgment on whether pipe lagging is indeed uniform in color and texture. If the suspect material looks darker due to water damage, it is appropriate for the inspector to consider this as part of the same homogeneous area. If the suspect material has been applied differently, however, it probably would not be uniform in color and texture since there would be a noticeable difference in the suspect materials appearance.

Question 87: If PCM is being used for clearance, does the sampling volume table in the mandatory TEM method have to be followed to determine the sampling volume for the PCM samples?

Answer: No. The table is required only for samples which will be analyzed by TEM. The table was set up to maintain an analytical sensitivity of 0.005 fibers per cubic centimeter (f/cm3) for the TEM analysis. The table does not apply to the PCM analysis.

Question 88: How does one determine the amount of air to sample for the PCM analysis to maintain a limit of quantification of 0.01 f/cm^3?

Answer: Follow the procedure in the EPA Silver Book, specifically outlined on pages 4-5. The volume required to reliably quantify fibers down to 0.01 f/cm^3 may be calculated using the first formula on these pages. Note that for NIOSH 7400, the minimum fiber loading is specified. Also, alert labs that the area of viewing for a field will vary between microscopes and that they must determine this value from their microscopes.

Question 89: Can dual-headed pumps be used at abatement sites when taking the five samples?

Answer: This avoids the intent of the directions given in the nonmandatory appendix for TEM. The method states: "Position ambient samples at locations representative of the air entering the abatement site." A dual-headed pump will not sample air at two different locations.

Question 90: Can someone collect more than five samples inside the abatement site and pick the best of the results for the clearance test?

Answer: No. An equal number of samples should be taken inside and outside the abatement site for clearance. The minimum number is five inside and five outside. The rule does not prohibit the collection of more than five samples inside and an equal number outside; however, collection of a higher number inside and then selecting only five of those values is not appropriate.

Question 91: How can the public get copies of the listing of accredited laboratories?

Answer: Contact a Regional Asbestos Coordinator or call the TSCA Hotline at (202) 554-1404.

XIII. WARNING LABELS

Question 92: Do you have to label enclosed or encapsulated ACBM in routine maintenance areas?

Answer: Yes. Section 763.95(a) states that "... the local education agency shall attach a warning label immediately adjacent to any friable and nonfriable ACBM and suspected ACBM assumed to be ACM located in routine maintenance areas (such as boiler rooms) at each school building. This shall include:

1) Friable ACBM that was responded to by a means other than removal.

2) ACBM for which no response action was carried out."

Question 93: What are some examples of routine maintenance areas that would require labeling? What does routine mean?

Answer: Examples are boiler rooms, equipment rooms, pipe tunnels, fan rooms, air handling rooms, or any other area that serves primarily as a maintenance area.

"Routine" means that a maintenance or custodial person frequents an area (see above) on a regularly scheduled or predictable basis to perform maintenance activities.

Question 94: In general, will school employees other than custodial and maintenance workers have to stay out of routine maintenance areas?

Answer: The rule does not prohibit other school employees from entering routine maintenance areas.

XIV. TRANSPORT AND DISPOSAL

Question 95: In Appendix D of the rule, dealing with the transport and disposal of asbestos waste, should the "shoulds" be interpreted as "shalls"? In other words, are these recommendations now requirements?

Answer: The recommendations in the transport and disposal guidance document-have not become requirements. LEAs have to comply with applicable DOT and NESHAP regulations governing transport and disposal, not with the recommendations found in Appendix D. Enforcement of Appendix D will be based on the current DOT and NESHAP regulations cited in the Appendix, not on the recommendations suggested therein.

XV. STATE WAIVERS

Question 96: Can EPA delegate the AHERA regulatory program to government agencies such as county and city governments? Several county and city governments have programs which are more stringent.

Answer: With respect to § 763.98 which addresses State waivers, these waivers apply only to States.

XVI. MISCELLANEOUS

Question 97: Who will review the management plans submitted by the Department of Defense (DOD)?

Answer: Section 203 (1) of AHERA requires the Secretary of Defense to carry out " any function, duty, or other responsibility imposed on a Governor of a State [for 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.)."

Question 98: Does the regulation explicitly prohibit any conflict of interest?

Answer: Yes. In Appendix A to the rule, the regulation states that TEM "…sampling operations must be performed by qualified individuals completely independent of the abatement contractor..."

Question 99: What are EPA's plans for developing standardized or model forms for inspections and/or management plans?

Answer: The EPA-funded model training course materials for trainers, available for purchase by calling 301/468-1916, and the LEA Guide to assist LEAs in complying with the new rule, mailed to LEAs in February, include model forms and formats for inspections and management plans, respectively.

Question 100: In a high school vocational-tech class dealing with automobile brake repairs, or in a school maintenance facility that repairs brakes on school buses, is the asbestos hazard from brake dust covered by AHERA?

Answer: No. AHERA covers asbestos-containing building materials only, and brake shoes are not building materials under AHERA. However, EPA believes it is advisable to establish a program to contain brake dust and prevent its release (see also OSHA's Appendix F to its rule). EPA has proposed a rule to phase out the use of asbestos in brakes and other products. Information on establishing a program to control brake dust can be found in the publication, Guidance for Preventing Asbestos Disease Among Auto Mechanics.

This publication is available from:

Superintendent of Documents

U.S. Government Printing Office

Washington, DC 20402

How many samples of miscellaneous material or nonfriable suspected material must be taken to determine if the material is asbestos-containing material (ACM) under the Asbestos Hazard Emergency Response Act (AHERA)?

For miscellaneous material, 40 CFR part 763.86(c) states that “in a manner sufficient to determine whether material is asbestos-containing material (ACM) or not ACM, an accredited inspector shall collect bulk samples from each homogeneous area of friable miscellaneous material that is not assumed to be ACM.” Although a specific number of samples are not mentioned, at least two samples from each homogeneous area of miscellaneous material must be taken due to the plural use of the word “samples.” An accredited inspector may determine that more than two samples are necessary to determine whether or not the material is ACM. In regard to nonfriable suspected material, 40 CFR part 763.86(d) also uses the plural word “samples” and therefore also requires a minimum of two samples. An accredited inspector can use his or her discretion to take more than two samples.

Chapter 6: Part One- Detection And Identification of ACBM
No Additional Reference Materials

Chapter 6: Part Two- Assessment of Materials

DETECTION, IDENTIFICATION, AND ASSESSMENT OF ASBESTOS-CONTAINING BUILDING MATERIALS (ACBMs)

Sections:

Detection and Identification of ACBM Presentation

Detection and Identification of ACBM Presentation Pictures

Detection, Identification and Assessment of ACBMs

Examples of Suspect ACBMs

Assessment of Materials Presentation

Assessment of Materials Presentation Pictures

DETECTION, IDENTIFICATION AND ASSESSMENT OF ASBESTOS-CONTAINING BUILDING MATERIALS

Prior to initiating any asbestos management program, it is obvious that the LEA, or any building owner must have a complete and accurate inventory of the asbestos-containing building materials (ACBMs) in their buildings. The AHERA rule has established what must now be considered the "state-of-the-art" work practices for developing such an inventory.

AHERA requires that asbestos inspections in schools be performed by accredited inspectors. To obtain accreditation, an inspector must attend an EPA-approved, three-day inspector course, and pass an examination on the last day.

The inspection process is essentially three phased. The first step is to identify those materials which are suspected of containing asbestos, next the material is identified as ACBM or non-ACBM, and finally the condition of the material is assessed by the accredited inspector.

Detection

The first thing an inspector must do to develop an asbestos inventory is decide which materials could contain asbestos. The AHERA rule says these are "suspect" materials. The rule also says that some materials are inherently suspect. All building materials that can be reduced to powder by hand pressure (friable building materials), such as sprayed-on ceiling finish, are suspect. It is up to the inspector, however, to decide if non-friable materials (such as wall board) are suspect. For non-friable materials, the inspector may decide that the material does not contain asbestos based on the information available, prior knowledge, or experience with that type of material. The inspector must use good judgment to ensure that all materials that could contain asbestos are identified as suspect. If any of those materials are missed than it follows that the material will not be managed as ACBM. If, on the other hand, the inspector categorizes materials that would not contain asbestos as suspect, the inspection can become excessively burdensome.

Identification

Once the suspect materials are identified, the next step for the inspector is to make a definitive determination as to which suspect materials are ACBMs. Again, there are options. The inspector may either collect a sample of the material for laboratory analysis by polarized light microscopy (PLM), or the material may be assumed to be asbestos-containing and treated as such throughout the management process. Assuming will reduce sampling costs, but any savings may be easily offset by the cost of managing non-ACBM as ACBM.

Assessment

All friable ACBMs must next be assessed. The assessment process as defined by AHERA involves evaluating the physical condition of the material. Most ACBMs that are in good condition and are not disturbed (i.e., pipe insulation or wallboard) will not release asbestos fibers into the atmosphere. Thus, the assessment process is the first towards evaluating the hazard associated with an ACBM. The friable ACBMs must be placed into one of seven assessment categories:

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

The rule requires that any decisions about managing the ACBMs identified will be based upon the assessment category chosen by the inspector.

Although the AHERA rule is fairly specific about the methods and procedures that will be used by the accredited inspector, that individual is still left with substantial freedoms and decision making requirements within those guideline. The LEA (probably the designee) needs to take steps to evaluate the field work of the inspector to ensure that he/she has used sound judgment in exercising those freedoms.

Re-typed 7/2011
RLH

Questions About Detection and Identification of ACBM

Source: 100 Commonly Asked Questions About the New AHERA Asbestos-In-Schools Rule. U.S. Environmental Protection Agency, Office of Toxic Substances, Washington, DC. May 1988. pg 20-23.

Question 36: Can a building inspector [i.e., an accredited asbestos inspector] use his/her own lab to analyze the bulk samples taken?

Answer: Yes, if the lab has interim EPA or NBIS accreditation

Question 37: Can an LEA just assume that some or all friable and non-friable suspect material contains ACM rather than taking samples?

Answer: Yes, Sections 763.86(a), (b), (c) and (d) explicitly permit suspect ACBM to be assumed to be ACM.

Question 38: What is “suspect” ACM? Can EPA provide a complete list?

Answer: EPA-approved training courses address what type of material might contain asbestos. In addition, these courses provide guidance on where these materials are typically located in buildings. A complete list of all suspected ACBM would be difficult to compile. However, the following is a partial list of materials that are classified as either suspected ACBM for purposes of the rule, or as materials not covered by the rule. Within the latter category, some materials may contain asbestos, but they are not building materials under the rule and therefore are not included in the AHERA rule. Other materials would not contain any asbestos, or enough asbestos to be defined as ACM under the rule.

EXHIBIT E-6: REPRESENTATIVE LIST OF MATERIALS LIKELY TO CONTAIN ASBESTOS

SUSPECT MATERIALS	MTRL TYPES	PLANS	SPECS
Cement Asbestos Insulating Panels	M	A	6
Cement Asbestos Wallboard	M	A	6
Cement Asbestos Siding	M	A	6
Roofing, Asphalt Saturated Asbestos Felt	M	A	7
Roofing, Reinforced Asbestos Flashing Sheet	M	A	7
Roofing, Asbestos Base Felt	M	A	7
Roofing, Asbestos Finishing Felt	M	A	7
Roof, Paint	S	A	7
Roofing, Flashing (tar and felt)	M	A	7
Roofing, Flashing (plastic cement for sheet metal work)	M	A	7
Waterproofing, Asbestos Base Felt	M	A	7
Waterproofing, Asbestos Finishing Felt	M	A	7
Waterproofing, Flashing	M	A	7
Dampproofing	M	A	7
Putty and/or Caulk	M	A	7/0
Door Insulation	M	A	8
Flooring, Asphalt Tile	M	A	9
Flooring, Vinyl Asbestos Tile	M	A	9
Flooring, Vinyl Sheet	M	A	9
Flooring, Backing	M	A	9
Plaster, Acoustical or Decorative	S	A	9
Ceiling Tile	M	A	9
Insulation, Thermal Sprayed-on	S	A	9
Blown-in Insulation	M	A	9
Insulation, Fireproofing	S	A	9
Taping Compounds	S	A	9
Paints	S	A	9
Textured Coatings	S	A	9
Packing or rope (at penetrations thru floors or walls)	M	A	9
Laboratory Hoods	M	A	11
Laboratory Oven Gaskets	M	A	11
Laboratory Gloves	M	A	11
Laboratory Bench Tops	M	A	11
Fire Curtains	M	A	12

A DESCRIPTION OF BUILDING MATERIALS

MATERIAL	SUSPECTED ACBM	NOT COVERED BY AHERA RULE
Concrete		X
Cinder block		X
Surfacing materials (spray-applied or troweled-on materials on walls and ceilings)	X	
Blackboards		X
Wallboard (material could be gypsum, transite, or other product)	X	
Pressed wood		X
Thermal system insulation	X	
Corrugated-like paper product used for thermal system insulation	X	
Wall or ceiling carpet		X
Gaskets in heating and air conditioning equipment	X	
Floor tile (including adhesives)	X	
Ceiling tile and panels	X	
Exterior roofing shingles		X*
Auditorium curtains		X*
Cement asbestos water pipe	X	
Chemical lab table and desk tops		X*
Fire doors	X	
Fire brick for boilers	X	
Suspected ACBM stored in school		X*
ACBM cloth adjoining air ducts	X	
Chemical lab gloves		X*
Fire blanket		X*
Glass		X
Steel		X
Sheeting in fume hood	X	
Brake shoes		X*
Kiln bricks and cement		X
Bunsen burner pad		X*

x* denotes that the material is not required to be sampled by the AHERA Rule, but it may contain asbestos

Elevators, Equipment Panels	M	A	14
Elevators, Brake Shoes	M	A	14
Elevators, Vinyl Asbestos Tile	M	A	14
HVAC Piping Insulation	TSI	M	15
HVAC Gaskets	TSI	M	15
Boiler Block or Wearing Surface	TSI	M	15
Breeching Insulation	TSI	M	15
Fire Damper	M	M	15
Flexible Fabric Joints (vibration dampening cloth)	M	M	15
Duct Insulation	TSI	M	15
Ductwork Taping	M	M	15
Flue, Seam Taping	M	M	15
Cooling Tower, Fill	M	M	15
Cooling Tower, Baffles or Louvers	M	M	15
Valve Packing	TSI	M	15
Plumbing, Piping Insulation	TSI	P	15
Plumbing, Pipe Gaskets	M	P	15
Plumbing, Equipment Insulation	TSI	P	15
Electrical Ducts (cable chases)	M	E	16
Electrical Panel Partitions	M	E	16
Electrical Cloth	M	E	16
Insulation, Wiring	M	E	16
Stage Lighting	M	E	16
Incandescent Recessed Fixtures	M	E	16
Chalkboards	M	A	10

Key to Appreviations for EXHIBIT E-6

Material Types

M = Miscellaneous Material
S = Surfacing Material
TSI = Thermal System Insulation

Plans:

Which drawings to reference for material location
A = Architectural Drawings
M = Mechanical Drawings
P = Plumbing Plans
E = Electrical Plans

Specs:

Which division used from uniform Construction Index (EXHIBIT E-7); Numbers 6-16

Chapter 7: Laboratory Analysis

LABORATORY ANALYSIS

Sections:

Learning Laboratory Buzz Words for Asbestos and AHERA

Labs Participating in NVLAP for Bulk Samples

Example Bulk Sampling Lab Analysis Form

Example Material Safety Data Sheets

EPA Clarifications:

- NESHAP Clarification Regarding Analysis of Multi-Layered Systems (1995)
- Advisory Regarding Availability of an Improved Asbestos Bulk Sample Analysis Test Method; Supplementary Information on Bulk Sample Collection and Analysis

LEARNING LABORATORY BUZZ WORDS FOR ASBESTOS AND AHERA

AIR SAMPLES:

(PCM) Phase Contrast Microscopy:

5 samples required per AHERA
Required for projects amounting to less than 160 square ft, 260 linear ft, 35 cubic ft
Reported in Fibers/Cubic Centimeter (f/cc)
Clearance reported as less than 0.01 f/cc

NOTE: Any fiber, such as asbestos, fiberglass, carpet, that meets the length to width ratio of 3:1 is considered a fiber and counted by this method

(TEM) Transmission Electron Microscopy:

13 samples required per AHERA (5 inside, 5 outside, 3 blanks)
Required for projects exceeding 160 square feet, 260 linear feet, 35 cubic feet
Reported in Structures per Millimeter Square (st/mm2)
Clearance reported as the arithmetic mean of less than 70 st/mm2

NOTE: Only asbestos fibers are counted with this method

BULK SAMPLES:

(PLM) Polarized Light Microscopy

Oil Dispersion Staining Technique
White/Blue/Brown Asbestos
Reported in Percent Asbestos
>1% is considered asbestos per AHERA

NOTE: The lower the percent of identified asbestos the greater the likelihood of error

(TEM) Transmission Electron Microscopy

Chemical Composition of Material
Reported in Percent Asbestos
Very Accurate

NESHAP:

>1% by visual estimate is considered asbestos

<10% can be Point Counted to verify if “truly” greater than 1% asbestos or not

Point Counting involves taking one bulk sample, breaking it into eight samples, counting the number of fibers on an open grid for each sample, and providing a statistical average using all four samples. You may get a number like 1.25% asbestos.

PROBLEMATIC BULK SAMPLES:

It is difficult to determine the presence of asbestos in the following types of materials because of their binding materials.

Asbestos Floor Tile
Plaster
Stucco
Roofing Membranes
Certain Types of Fire-Proofing
Certain Types of Ceiling Tiles

The best way to analyze these types of materials is to use one of the following methods and then subject the remaining material to the PLM method:

The **Acid Wash** method uses acid to dissolve the binders in the bulk material leaving the asbestos in the residue.

Gravimetric Reduction ashes the binders in the bulk material leaving the asbestos in the residue.

LABORATORY ANALYSIS INTERPRETATION:

YOU MUST USE A LAB THAT PARTICIPATES IN THE NVLAP FOR BULK SAMPLE ANALYSIS!!!

Contact the National Institute of Standards & Technology (NIST) for a current list of NVLAP labs (http://ts.nist.gov/ts/htdocs/210/214/214.htm)

>1% by visual estimate is considered asbestos per AHERA

<1% asbestos is not considered asbestos per AHERA
NOTE: Be certain ALL samples are less than 1% asbestos

Results Reported in Various Ways can be Misleading. For Example:

≥1% asbestos
≤1% asbestos
Trace: Found a single asbestos fiber or bundle
ND: None Detected
NAD: No Asbestos Identified

SPECIALIZED SAMPLING TECHNIQUES FOR ASBESTOS IN SETTLED DUST:

This method can be used when asbestos has been disturbed, and it is unclear how large of an area has been contaminated.

Micro-vac Sampling: Involves using a personal sampling pump set at 2 liters per minute, a 25 or 37 mm cassette with a tube extended on the end of the cassette, and vacuuming 100 square centimeters for two minutes.

Results are analyzed by TEM and reported as structures per square centimeter.

1000 st/cm2: Are considered low if less than this amount

10,000 st/cm2: Are considered above background levels if above this amount

100,000 st/cm2: Are considered high if above this amount and some sort of abatement activity may be necessary.

Laboratories Participating in NVLAP* Bulk Samples for Asbestos Fiber Analysis Program in North Carolina

Eurofins CEI, Inc. 730 SE Maynard Road Cary, NC 27511 Phone: 919-481-1413 Fax: 919-481-1442 Website: www.eurofinsus.com/CEI Lab. Type: Commercial Testing Service	**NVLP Lab. Code: 101768-0** Contact: Tianbao Bai Email: tianbao.bai@eurofinset.com Bulk Asbestos Analysis (PLM) Airborne Asbestos Analysis (TEM) Accreditation valid through: 3/31/2025
EMSL Analytical, Inc. 706 Gralin Street Kernersville, NC 27284 Phone: 336-992-1025 Fax: 336-992-4175 Website: www.emsl.com Lab. Type: Commercial Testing Service	**NVLP Lab. Code: 102104-0** Contact: Stephen Bennett Email: sbennet@emsl.com Bulk Asbestos Analysis (PLM) Airborne Asbestos Analysis (TEM) Accreditation valid through: 6/30/2024
EMSL Analytical, Inc. 2500 Gateway Centre, Ste. 600 Morrisville, NC 27560 Phone: 919-465-3900 Fax: N/A Website: www.emsl.com Lab. Type: Commercial Testing Service	**NVLP Lab. Code: 200671-0** Contact: Stephen Bennett Email: sbennet@emsl.com Bulk Asbestos Analysis (PLM) Airborne Asbestos Analysis (TEM) Accreditation valid through: 5/31/2025
EMSL Analytical, Inc. 10801 Southern Loop Blvd. Pineville, NC 28134 Phone: 919-465-3900 Fax: 704-525-2382 Website: www.emsl.com Lab. Type: Commercial Testing Service	**NVLP Lab. Code: 200841-0** Contact: Lee Plumley Email: lplumley@emsl.com Bulk Asbestos Analysis (PLM) Airborne Asbestos Analysis (TEM) Accreditation valid through: 6/30/2024
Scientific Analytical Institute 4604 Dundas Drive Greensboro, NC 27407 Phone: 336-292-3888 Fax: 336-292-3313 Website: www.sailab.com Lab. Type: Commercial Testing Service	**NVLP Lab. Code: 200664-0** Contact: Nathaniel Durham Email: ndurham@sailab.com Bulk Asbestos Analysis (PLM) Airborne Asbestos Analysis (TEM) Accreditation valid through: 12/31/2024
Universal Engineering Sciences Laboratories-Asbestos Fiber Analysis 10121 Pineville Distribution Street Pineville, NC 28134 Phone: 803-280-6431 Fax: N/A Website: www.emsl.com Lab. Type: Commercial Testing Service	**NVLP Lab. Code: 600344-0** Contact: Cass Elizabeth Rupert Email: crupert@summit-companies.com Bulk Asbestos Analysis (PLM) Accreditation valid through: 12/31/2024

Revised: 3/27/2025 RR

EMSL Analytical, Inc.
706 Gralin Street, Kernersville, NC 27284
Phone/Fax: (336) 992-1025 / (336) 992-4175
http://www.EMSL.com greensborolab@emsl.com

EMSL Order: [redacted]
CustomerID: [redacted]
CustomerPO:
ProjectID:

Attn: [redacted]
NC Health Hazards Control Unit
5505 Six Forks Rd
Raleigh, NC

Phone: (919) 707-5900
Fax:
Received: 07/14/14 10:20 AM
Analysis Date: 7/15/2014
Collected:

Project: **NESHAP**[redacted]

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
46545-1-01 *021403849-0001*	Textured Ceiling	Tan/White Fibrous Homogeneous	2% Cellulose	10% Perlite 85% Non-fibrous (other)	**3% Chrysotile**
46545-1-02 *021403849-0002*	Textured Ceiling	Tan/White Fibrous Homogeneous	2% Cellulose	10% Perlite 85% Non-fibrous (other)	**3% Chrysotile**

Analyst(s)
Kristie Elliott (2)

[redacted]
[redacted], Laboratory Manager
or other approved signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%

Samples analyzed by EMSL Analytical, Inc. Kernersville, NC NVLAP Lab Code 102104-0, CA ELAP 2689, Virginia 3333-000228, West Virginia LT000321

Initial report from 07/16/2014 08:53:51

EMSL Analytical, Inc.
706 Gralin Street, Kernersville, NC 27284
Phone/Fax: (336) 992-1025 / (336) 992-4175
http://www.EMSL.com greensborolab@emsl.com

EMSL Order: [redacted]
CustomerID: [redacted]
CustomerPO:
ProjectID:

Attn: [redacted]
NC Health Hazards Control Unit
5505 Six Forks Rd
Raleigh, NC

Phone: (919) 707-5900
Fax:
Received: 07/21/14 10:20 AM
Analysis Date: 7/21/2014
Collected:

Project: [redacted]

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos				Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**		**% Non-Fibrous**		**% Type**
46738-1-01 *021403946-0001*	Water Proofing	Black Fibrous Homogeneous	60%	Cellulose	40%	Non-fibrous (other)	**None Detected**
4-6738-2-01-White Coat *021403946-0002*	Plaster Walls	White Non-Fibrous Homogeneous	<1%	Cellulose	100%	Non-fibrous (other)	**None Detected**
4-6738-2-01-Gray Coat *021403946-0002A*	Plaster Walls	Gray Non-Fibrous Homogeneous			10% 90%	Quartz Non-fibrous (other)	**None Detected**
4-6738-2-01-Beige Coat *021403946-0002B*	Plaster Walls	Beige Non-Fibrous Homogeneous	<1%	Cellulose	10% 90%	Quartz Non-fibrous (other)	**None Detected**
46738-3-01 *021403946-0003*	Drywall	Brown/Gray Fibrous Homogeneous	15%	Cellulose	85%	Non-fibrous (other)	**None Detected**
46738-4-01 *021403946-0004*	Tarred Fiberglass Insulation Backing	Brown/Black Fibrous Homogeneous	90% 5%	Cellulose Glass	5%	Non-fibrous (other)	**None Detected**
46738-5-01 *021403946-0005*	Drywall	White Non-Fibrous Homogeneous	<1%	Cellulose	20% 80%	Ca Carbonate Non-fibrous (other)	**None Detected**
46738-6-01 *021403946-0006*	Joint Compound	Brown/Gray Fibrous Homogeneous	15%	Cellulose	85%	Non-fibrous (other)	**None Detected**

Analyst(s)
Kristie Elliott (8)

Stephen Bennett, Laboratory Manager
or other approved signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%
Samples analyzed by EMSL Analytical, Inc. Kernersville, NC NVLAP Lab Code 102104-0, CA ELAP 2689, Virginia 3333-000228, West Virginia LT000321

Initial report from 07/22/2014 08:34:42

Material Safety Data Sheet

HI-Abuse® BRAND XP® Gypsum Board

MSDS No: **GB-1004**

Date: July 1, 2009

Supersedes Date: May 22, 2006

1. PRODUCT AND COMPANY INFORMATION

Manufacturer Information:
National Gypsum Company
2001 Rexford Road
Charlotte, NC 28211

For Emergency Product Information Call:
Director Quality Services
(704) 551-5820 - 24 Hour Emergency Response
Website: www.nationalgypsum.com

Product Name: **Hi-Abuse®XP®**

Use: Wall assemblies in areas where surface durability and impact resistance are major concerns.

Generic Descriptions: Article composite. Hi-Abuse XP Gypsum Board panels consist of a fire resistant, gypsum core encased in heavy smooth abrasion resistant mold/mildew-resistant, 100% recycled purple paper on face side and heavy mold/mildew-resistant liner paper on the back side.

2. HAZARDS IDENTIFICATION

Appearance and Odor: A gypsum core wrapped with paper. Composite material provides mildew protection. Surface finish will vary with product, no odor.

Contains no asbestos. HMIS Hazard Class No. 1, 0, 0.

Emergency Overview

Hi-Abuse® XP® Gypsum Board products do not present an inhalation, ingestion, or contact health hazard unless subjected to operations such as sawing, sanding or machining which result in the generation of airborne particulate. This product contains quartz (crystalline silica) as a naturally occurring contaminant. It is recommended that a NIOSH approved particulate respirator be worn whenever working with this product results in airborne dust exposure exceeding the prescribed limits.
(See Section 11 - Toxicological Information)

OSHA Regulatory Status

While this material is not considered hazardous by the OSHA Hazard Communication Standard (29CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

2. HAZARDS IDENTIFICATION (CONTINUED)

Potential Health Effects

Primary Routes of Entry: Inhalation, Dermal contact

Target Organs: Respiratory system, skin, eyes.

Inhalation: Acute exposure to airborne dust concentrations in excess of the PEL/TLV may result in coughing, dyspnea, wheezing, general irritation of the nose, throat, and upper respiratory tract, and impaired pulmonary function. Chronic exposures may result in lung disease (silicosis and/or lung cancer). (See Section 11 - Toxicological Information)

Exposures to respirable crystalline silica have not been documented during normal use of this product. However, good housekeeping practices and industrial hygiene monitoring is recommended when the potential for significant exposure exists.

Skin Contact: Continued and prolonged contact may result in dry skin. Contact with dust or glass fibers may produce itching, rash and/or redness. Repeated or prolonged exposure may result in dermatitis.

Eye Contact: Direct contact may cause mechanical irritation.

Ingestion: No known adverse effects. May result in obstruction or temporary irritation of the digestive tract.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-Number	Weight Percent
Calcium Sulfate Dihydrate (Gypsum)	10101-41-4	>85
Crystalline Silica (Quartz)	14808-60-7	<5
Cellulose (Paper Fiber)	9004-34-6	<10
Proprietary Additives	NA	<1

4. FIRST AID MEASURES

- **Inhalation:** Remove exposed individual to fresh air immediately. If breathing difficulty persists, seek medical attention.
- **Skin:** Flush and wash skin with soap and water. Utilize lotions to alleviate dryness if present. Seek medical attention if irritation persists.
- **Eye:** Immediately flush eyes with water for 15 minutes. Remove contact lenses (if applicable). Seek medical attention if irritation persists.
- **Ingestion:** Gypsum is non-hazardous and no harmful effects are expected upon ingestion of small amounts. Larger amounts may cause abdominal discomfort or possible obstruction of the digestive tract. Seek medical attention if problems persist.

5. FIRE FIGHTING MEASURES

Flammable Properties
- Not flammable or combustible
- NFPA Hazard Class No: 1/0/0

Extinguishing media
- Dry chemical, foam, water, fog or spray

Protection of firefighters
- Standard protective equipment and precautions

Fire and Explosion Hazards
- None

Hazardous Combustion Products
- None
- Above 1450^{o}C, material can decompose and release sulfur dioxide (SO_2) and oxides of carbon.

6. ACCIDENTAL RELEASE MEASURES

Not applicable, as product is an article composite.

General recommendations:

- Wear appropriate Personal Protective Equipment. (See Section 8)
- Maintain proper ventilation.
- Pick-up larger pieces to avoid a tripping hazard. Return large pieces of damaged/scraped material for recycling. Sweep or vacuum remaining material into a waste container for disposal. Use a light water spray to minimize dust generation.
- Waste material is not a hazardous waste. Dispose of in accordance with applicable federal, state, and local regulations.

7. HANDLING AND STORAGE

- Avoid contact with eyes, skin and clothing.
- Wear recommended personal protective equipment when handling. (See Section 8)
- Avoid breathing dust.
- Minimize generation of dust.
- Utilize proper lifting techniques when moving product and employ mechanical/ergonomic assistance when possible (i.e. move with forklifts, hold in place with lifts) to minimize the risk of back injury.
- Store material in a cool, dry, ventilated area.
- Store panels flat to minimize damage and warping.
- Do not stack panels too high when storing to minimize the risk of falling.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

	Exposure Limits	
Component	**OSHA PEL** (mg/m3)	**ACGIH TLV** (mg/m3)
Calcium Sulfate Dihydrate (Gypsum)	15 (T) 5 (R)	10 (T)
Crystalline Silica (Quartz)	0.1 (R)	0.025 (R)
Cellulose (Paper Fiber)	15 (T) 5 (R)	10 (T)
Proprietary Additives	NE	NE

T- Total Dust
R- Respirable Dust
NE- Not established

Engineering Controls

- Work/Hygiene Practices: The score and snap method of cutting is recommended. Sawing, drilling or machining will produce dust.
- Ventilation: Provide local and general exhaust ventilation to maintain a dust level below the PEL/TLV.
- Utilize wet methods, when appropriate, to reduce generation of dust.

Personal Protective Equipment

- Respiratory Protection: A NIOSH approved particulate respirator is recommended in poorly ventilated areas or if the PEL/TLV is exceeded. OSHA's 29 CFR 1910.134 (Respiratory Protection Standard) must be followed whenever work conditions require respirator use.
- Eye Protection: Safety glasses or goggles.
- Skin: Gloves, protective clothing and/or barrier creams may be utilized if conditions warrant.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: paper faced gypsum boards with white/gray core
Odor: None
Physical State: Solid
Ph: ~7
Solubility (H2O): 2.1 g/L @ 20°C
Boiling, Freezing, Melting Point: Not Applicable
Decomposition Temperature: 1450°C
Vapor pressure: Not Applicable
Vapor density: Not Applicable
Volatile organic compounds (VOC) content: None

Flammability: Not Applicable
Flash Point: Not Applicable
Upper/Lower explosive limits: Not applicable
Auto-ignition temperature: Not Applicable
Partition coefficient: n-octanol/water: Not applicable
Evaporation rate: Not Applicable
Molecular weight: 172.2 grams
Molecular formula: $CaSO_4.2H_2O$
Specific Gravity: 2.31 g/cc
Bulk Density: ~55 lb/ft3

10. STABILITY AND REACTIVITY

Chemical stability: Stable in dry environments.
Conditions to avoid: Contact with strong acids may result in generation of carbon dioxide.
Incompatibility: None
Hazardous decomposition: Above 1450^{o}C gypsum will decompose to calcium oxide (CaO), with releases of sulfur dioxide (SO_2) and various oxides of carbon.
Hazardous polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Data presented is for the major component of this product: Gypsum (calcium sulfate dihydrate)

Human Data
There is no information on toxicokinetics, metabolism and distribution.

There have been reports of irritation to mucus membranes of the eyes and respiratory tract upon acute exposure to dusts in excess of the recommended limits.

Chronic exposure to crystalline silica (a naturally occurring contaminant in gypsum) in the respirable size has been shown to cause silicosis, a debilitating lung disease. In addition, the International Agency for Research on Cancer (IARC) classifies crystalline silica inhaled in the form of quartz or cristobalite from occupational sources as carcinogenic to humans, Group 1. The National Toxicology Program (NTP) classifies respirable crystalline silica as a substance which may be reasonably anticipated to be a carcinogen. OSHA does not regulate crystalline silica as a human carcinogen. Industrial hygiene monitoring to date has not identified any detectable respirable crystalline silica in dust sampling conducted during gypsum panel installation utilizing recommended procedures.

Animal Data
The acute oral toxicity study [OECD TG 420, Fixed dose procedure] of calcium sulfate dihydrate showed that this chemical did not cause any changes even at 2,000 mg/kg b.w. Therefore, the oral LD_{50} value was more than 2,000-mg/kg b.w. for female rats (Sprague-Dawley).

Calcium sulfate, dihydrate was not irritating to the skin of rabbits at 1, 24, 48 and 72 hours after removal of test patches [OECD TG 404]. There is no indication of skin sensitization in guinea pigs [OECD TG 406].

Invivo and *Invitro* studies for mutagenicity were negative.

Reproduction/Developmental Toxicity Screening Tests were negative.

12. ECOLOGICAL INFORMATION

This product does not present an ecological hazard to the environment.

Ecotoxicological Information
Toxicity studies performed with fish, aquatic invertebrates and aquatic plants showed no toxic effect.

Environmental Fate
Gypsum is a naturally occurring mineral. Biodegradation and/or bioaccumulation potential is not applicable.

13. DISPOSAL CONSIDERATIONS

- Dispose of according to Local, State, Federal, and Provincial Environmental Regulations.
- Recycle if possible.

14. TRANSPORT INFORMATION

- This product is not a DOT hazardous material
- Shipping Name: Same as product name
- ICAO/IATA/IMO: Not applicable

15. REGULATORY INFORMATION

All ingredients are included on the TSCA inventory.

Federal Regulations

SARA Title III: Not listed under Sections 302, 304, and 313
CERCLA: Not listed
RCRA: Not listed
OSHA: Dust and potential respirable crystalline silica generated during product use may be hazardous.

State Regulations
California Prop 65: Respirable crystalline silica is known to the state of California to cause cancer. Industrial hygiene monitoring during recommended use of this product failed to identify any respirable crystalline silica.

Canada WHMIS
All components of this product are included in the Canadian Domestic Substances List (DSL).
Crystalline silica: WHMIS Classification D2A

16. OTHER INFORMATION

MSDS Revision Summary

Effective Date Change:	5/22/06	Supersedes: 3/22/04
Format Changes:	ANSI Z400.1-2004	

Key/Legend

ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Chemical Abstract Services Number
CFR	Code of Federal Regulations
DOT	Department of Transportation
EPA	Environmental Protection Agency
HEPA	High Efficiency Particulate Air
HMIS	Hazardous Material Identification System
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
NIOSH	National Institute for Occupational Safety and Health
NFPA	National Fire Protection Association
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PPE	Personal Protective Equipment
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average
WHMIS	Workplace Hazardous Materials Information System

16. OTHER INFORMATION (CONTINUED)

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind expressed or implied is made with respect to the information contained herein. This material safety data sheet was prepared to comply with the OSHA Hazard Communication Standard (29 CFR 1910.1200) and with the Workplace Hazardous Materials Information System (WHMIS).

Disclaimer of Liability:
As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of the material. Information contained herein is believed to be true and accurate, but all statements or suggestions are made without any warranty, express or implied, regarding accuracy of the information, the hazards connected with the use of the material, or the results to be obtained for the use thereof.

MATERIAL SAFETY DATA SHEET

Armstrong

Armstrong/DLW Linoleum Products

Prepared 6/12

Armstrong World Industries, Inc.
P. O. Box 3001
Lancaster, PA 17604
www.armstrong.com
MSDS: www.floorexpert.com
Technical Services:
1-877-276-7876, Option 2,3,3

I. PRODUCT IDENTIFICATION

Name: Armstrong / DLW Linoleum Products
Description: Oleoresinous Flooring

II. DEPARTMENT OF TRANSPORTATION INFORMATION

Shipping name: Not Classified. Hazard Class: N/A. ID #: N/A.
EMERGENCY ONLY CONTACT: CHEM-TEL - 1-800-255-3924

III. HMIS (0=minimal hazard; 4 = severe hazard)

Health = 0 Flammability = 1 Reactivity = 0

IV. PRODUCT CONTENT

This product does not contain chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372. All components are on TSCA inventory. This product does NOT contain asbestos.

V. HAZARDOUS INGREDIENTS

(Chemical Identity; Common Name)	C.A.S. No.	%	OSHA PEL	ACGIH TLV
None	N/A	N/A	N/A	N/A

DESCRIPTION AND INGREDIENT INFORMATION

These oleoresinous flooring products are produced for residential and commercial use. They come in a wide variety of designs, styles, colors and sizes.

MISCELLANEOUS INFORMATION

Each of these products is classified as an "article" according to Title 29 of the Code of Federal Regulations, OSHA Part 1910.1200(c). They are formed to a specific shape or design during manufacture, have end use functions dependent upon their shape or design, and do not release any hazardous chemical under normal conditions of use.

VI. PHYSICAL DATA

APPEARANCE: Material dependent. BOILING POINT (degrees F): N/A. VAPOR PRESSURE (mm Hg @ 20 degrees C): N/A. VAPOR DENSITY (Air = 1): N/A. PERCENT VOLATILE BY WEIGHT (30 min. @ 275 degrees F): N/A. EVAPORATION RATE (Butyl Acetate = 1): N/A. SOLUBILITY IN WATER: N/A. SPECIFIC GRAVITY (H_20 = 1): N/A. pH: N/A.

VII. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A. FLAMMABLE RANGE: LEL = N/A; UEL = N/A. EXTINGUISHING MEDIA: Water. SPECIAL FIRE FIGHTING PROCEDURES: Protect fire fighters from toxic products of combustion by wearing self-contained breathing apparatus. UNUSUAL FIRE AND EXPLOSION HAZARDS: None.

VIII. HEALTH HAZARD DATA

PRIMARY ROUTE(S) OF ENTRY: N/A. TARGET ORGANS: N/A. EFFECTS OF OVEREXPOSURE: N/A. SKIN AND EYES: N/A. INHALATION: N/A. CARCINOGENICITY: NTP: No; IARC Monographs: No; OSHA Regulated: No. MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: N/K. FIRST AID PROCEDURES: N/A. SKIN AND EYES: N/A. INHALATION: N/A. INGESTION: N/A.

IX. REACTIVITY DATA

STABILITY: N/A. INCOMPATIBILITY: N/A. HAZARDOUS DECOMPOSITION PRODUCTS: N/A. HAZARDOUS POLYMERIZATION: N/A.

X. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: N/A. WASTE DISPOSAL METHOD: Dispose of in accordance with Federal, State, and Local Waste Disposal Regulations.

XI. SPECIAL HANDLING AND USE INFORMATION

VENTILATION: N/A. RESPIRATORY PROTECTION: N/A. SKIN AND EYE PROTECTION: N/A.

XII. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: N/A. OTHER PRECAUTIONS: N/A. WORK SITE ENVIRONMENT: Initially there may be a potential adverse impact on indoor air quality within the general work area during the installation process. Therefore you should advise the building manager or other appropriate person that: • It will be necessary to establish and maintain adequate ventilation of the work area, without causing the entry of contaminants to other parts of building; and • Persons who are sensitive to odors and/or chemicals should be advised to avoid the work area during this process.

XIII. WARNING

FOR PREVIOUSLY INSTALLED FLOOR COVERING

DO NOT SAND, DRY SCRAPE, BEADBLAST, OR MECHANICALLY PULVERIZE EXISTING RESILIENT FLOORING, BACKING OR LINING FELT. THESE PRODUCTS MAY CONTAIN EITHER ASBESTOS FIBERS OR CRYSTALLINE SILICA. POSSIBLE CANCER AND RESPIRATORY TRACT HAZARD BY INHALATION. AVOID CREATING DUST. SMOKING BY INDIVIDUALS WHO HAVE BEEN EXPOSED TO ASBESTOS FIBERS GREATLY INCREASES THE RISK OF SERIOUS BODILY HARM. RFCI'S (Resilient Floor Covering Institute) RECOMMENDED WORK PRACTICES FOR REMOVAL OF RESILIENT FLOOR COVERINGS ARE A DEFINED SET OF INSTRUCTIONS ADDRESSED TO THE TASK OF REMOVING ALL RESILIENT FLOOR COVERING STRUCTURES.

XIV. NOTICE

Various government agencies have regulations governing the removal of inplace asbestos-containing materials. If you contemplate the removal of a resilient floor covering structure that contains (or is assumed to contain) asbestos, you should determine whether such regulations apply.

The information presented herein is supplied as a guide to those who handle or use this product. Safe work practices must be employed when working with any materials. It is important that the end user makes a determination regarding the adequacy of the safety procedures employed during the use of this product.

N/A - not applicable or not available
N/K - none known or not known

MATERIAL SAFETY DATA SHEET

NPCA

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by US Department of Labor Essentially Similar to Form OSHA 20)

Date Issued 5/17/00

SECTION I

MANUFACTURERS NAME
GARDNER ASPHALT CORPORATION

STREET ADDRESS
4161 E 7TH AVENUE

CITY, STATE, AND ZIP CODE
TAMPA, FL 33605

EMERGENCY TELEPHONE NUMBER
1-800-424-9300

PRODUCT CLASS
SIG SERIES FIBERED ASPHALT ROOF COATING A/F AKA/FIBERED ROOF & FOUNDATION CTG.

MANUFACTURER'S CODE IDENTIFICATION
0330, 0340, 0370, 2340,2330,2370, 2380, 3050GA

TRADE NAME
GARDNER, BLACKJACK, WEATHERSEAL

SECTION II- HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT	TLV PPM	TLV Mg/M3	LEL	VAPOR PRESSURE
PETROLEUM ASPHALT **CAS # - 8052-42-4**	<50%		0.5 Fume		
PETROLEUM SOLVENT **CAS #- 6472-48-9**	<20%				
ASBESTOS FIBER **CAS #- 1332-21-4**	<10%		0.2		
KAOLIN CLAY **CAS #- 1332-58-7**	<15%		10*		
CALCINED CLAY **CAS #- 66402-68-4**	<15%		5.0		

ADDITIONAL INFORMATION-* AS RESPIRABLE DUST ONLY.

Hazardous Materials Identification System (HMIS)

Health	Flammability	Reactivity	Personal Protection
1	2	0	G

SECTION III – PHYSICAL DATA

BOILING RANGE: 300 ºF - 390ºF

VAPOR DENSITY ☒ HEAVIER ☐ LIGHTER, THAN AIR

EVAPORATION RATE ☐ FASTER ☒ SLOWER, THAN ETHER

PERCENT VOTILE BY VOLUME 25 %

WEIGHT PER GALLON BY VOLUME 8.7 LBS

SECTION IV – FIRE AND EXPLOSION HAZARD DATA

DOT CATEGORY - NR

FLASH POINT- 105ºF Minimum

EXTINGUISHING MEDIA- **FOAM, & DRY CHEMICAL , CARBON DIOXIDE .**

UNUSUAL FIRE AND EXPLOSION HAZARDS- **KEEP AWAY FROM SOURCES OF IGNITION.**

SPECIAL FIRE FIGHTING PROCEDURES- **USE OF A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED FOR FIREFIGHTERS. WATER MAY CAUSE FROTHING, APPLY CAUTIOUSLY.**

SECTION V – REACTIVITY DATA

STABILITY: ☐ UNSTABLE ☒ STABLE CONDITIONS TO AVOID: SPARK, FLAMES, ELECTRICAL AND STATIC DISCHARGE.

INCOMPATIBILTY (MATERIALS TO AVOID): STRONG OXIDIZERS, ACIDS,

HAZARDOUS DECOMPOSITION PRODUCTS: CARBON DIOXIDE, CARBON MONOXIDE

HAZARDOUS POLYMERIZATION: ☐ MAY OCCUR ☒ WILL NOT OCCUR

CONDITIONS TO AVOID: NONE

SECTION VI-HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE- ACUTE: SKIN: PROLONGED REPEATED CONTACT MAY CAUSE IRRITATION. EYES: CONTACT MAY CAUSE IRRITATION, BLURRED VISION. INHALATION: EXCESSIVE BREATHING OF HIGH VAPOR CONCENTRATION CAN CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, NAUSEA AND POSSIBLE UNCONSCIOUSNESS AND EVEN ASPHYXIATION. INGESTION: CAN CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING AND DIARRHEA. ASPIRATION OF MATERIAL INTO LUNGS CAN CAUSE CHEMICAL PNEUMONITIS, WHICH CAN BE FATAL. CARCINOGENICITY: NO. MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: PRE-EXISTING LUNG AND SKIN DISORDERS. REPRODUCTIVE EFFECTS: ND. TERATOGENIC: ND. MUTAGENIC: ND.
CALIF. PROP. 65 • CHEMICAL WARNING (CALIFORNIA HEALTH AND SAFETY CODE #25249.5 ET SEQ).
WARNING: This product contains chemicals known to the State of California to cause cancer, birth defects or reproductive harm. Read and follow label directions and information given on Material Safety Data Sheets and use care when handling or using all petroleum products.
EMERGENCY FIRST AID PROCEDURE- SKIN: WASH EXPOSED AREAS WITH SOAP AND WATER. EYES: FLUSH EYES WITH COPIOUS AMOUNTS OF WATER , IF SYMPTOMS PERSIST, CONSULT A PHYSICIAN. INHALATION: REMOVE PERSON TO FRESH AIR. IF BREATHING IS DIFFICULT ADMINISTER OXIGEN. IF BREATHING STOPS, GIVE ARTIFICIAL RESPIRATION. SEEK MEDICAL ATTENTION IMMEDIATELY. INGESTION: DO NOT INDUCE VOMITING.

SECTION VII – SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: DIKE SPILL AREA, RECOVER FREE LIQUID. ADD ABSORBENT TO SPILL AREA. REMOVE SOURCES OF IGNITION. WASH AND VENTILATE AREA.

WASTE DISPOSAL METHOD: DISPOSE IN ACCORDANCE WITH LOCAL, STATE OR FEDERAL REGULATIONS.

SECTION VIII – SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: NOT NORMALLY REQUIRED IN WELL-VENTILATED AREA. IF TLV IS EXCEEDED, A NIOSH/MSHA APPROVED BREATHING APPARATUS IS RECOMMENDED.

VENTILATION: USE WITH ADEQUATE VENTILATION. MAINTAIN EXPOSURE BELOW TLV LEVEL.

PROTECTIVE GLOVES: NITRILE RUBBER GLOVES SHOULD BE USED.

EYE PROTECTION: SAFETY GOGGLES SHOULD BE USED.

OTHER PROTECTIVE EQUIPMENT: AS NECESSARY

SECTION IX – REGULATORY INFORMATION

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: STORE IN COOL DRY AREA.

OTHER PRECAUTIONS: KEEP OUT OF REACH OF CHILDREN AND AWAY FROM SOURCES OF IGNITION. AVOID CONTACT WITH SKIN OR CLOTHING. KEEP CONTAINER CLOSED. WASH THOROUGHLY AFTER USING.
OTHER PRECATIONS: KEEP OUT OF REACH OF CHILDREN AND AWAY FROM SOURCES OF IGNITION. AVOID CONTACT WITH SKIN OR CLOTHING. KEEP CONTAINER CLOSED.
REPORTABLE QUANTITY (MIN. UNDER ANY ACT): NONE
RCRA HAZARDOUS WASTE WASTE NO: (FED)NONE SHIPPING NAME: CEMENT, ROOFING. NOI
NORTH AMERICAN EMERGENCY RESPONSE GUIDE NUMBER: N/A
DOT CLASSIFICATION: NOT REGUIATED AS PER 49 CFR 171.8 & 49 CPR 173.124 (A)
IDENTIFICATION NO: NMFC ITEM NO. 170060 NMFC CLASS S5.
VOLATILE ORGANIC COMPOUNDS (VOC); 300 G/L MAX.

SDS Date: August, 2016

Safety Data Sheet

Per GHS Standard Format

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name: ABC® Asbestos Binding Compound No. 6421 White, No. 6422 Clear, No. 6423 Green

Recommended Use of Product: Binder for Asbestos Fibers

Information on the Supplier of the Safety Data Sheet

Manufactured For:
Fiberlock Technologies, Inc.
150 Dascomb Road
Andover, MA 01810
P: 800-342-3755 F: 978-475-6205

Emergency Telephone Numbers:
CHEM TEL: (U.S.): 1-800-255-3924
(Outside the U.S.): 813-248-0585

SECTION 2: HAZARDS IDENTIFICATION

Signal Word: **WARNING**



GHS Label Statements
Hazard Statements:
Harmful if inhaled.
Causes mild skin irritation.
Causes serious eye irritation.

GHS Classifications
This product is considered hazardous by The 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)
Acute Toxicity-Inhalation (Vapors) Category 4
Acute Toxicity-Inhalation (Dust-mists) Category 2
Serious eye damage/eye irritation – Category 2
Skin sensitization – Category 1

PRECAUTIONARY STATEMENTS

Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protection (eye protection, gloves) during application. When grinding/sanding dry films, wear respiratory protection.
Response: If on skin, wash with plenty of soap and water. If in eyes, rinse cautiously for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. If inhaled, remove victim to fresh air. If exposed or concerned, get medical advice.
Storage: Keep closures tight and containers upright to prevent leakage. KEEP FROM FREEZING. Product is non-combustible.
Disposal: The coating and any contaminated diking material should be thoroughly air dried and collected into drums. The drums should be sealed and labeled and land-filled or incinerated according to local, regional and national regulations.

Hazards Not Otherwise Classified (NHOC): Not applicable
Other Information: Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

SECTION 3: COMPOSITION INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	Weight, %**
Titanium dioxide	13463-67-7	10-30

***Not present in Cleartone base or Green**
****The exact concentration of composition has been withheld as a trade secret.**

SECTION 4: FIRST AID MEASURES

General Advice
Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact
If symptoms persist, call a physician. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Do not rub affected area.

Skin Contact
Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician. May cause an allergic skin reaction.

Inhalation
Remove to fresh air. If symptoms persist, call a physician. If breathing has stopped, give artificial respiration. Get medical attention immediately. If not breathing, give artificial respiration. Do not breathe dust.

Ingestion
Do NOT induce vomiting. Rinse mouth immediately and drink plenty of water. Never give anything by mouth to an unconscious person. Get medical attention.

Self-Protection of the First Aider
Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Wear personal protective clothing (see section 8). Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid breathing vapors or mists.

Most important symptoms and effects, both acute and delayed

Most Important Symptoms and Effects
Burning sensation. Coughing and/or wheezing. Difficulty in breathing. Itching. Rashes. Hives.

Indication of any immediate medical attention and special treatment needed

Notes to Physician
Treat symptomatically. May cause sensitization of susceptible persons.

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media: CAUTION: Use of water spray when fighting fire may be inefficient.

Specific Hazards Arising from the Chemical: Product is/or contains a sensitizer. May cause sensitization by skin contact.

Uniform Fire Code:
Sensitizer: Liquid Toxic: Liquid

Hazardous Combustion Products: Carbon oxides

Explosion Data
Sensitivity to mechanical impact No.
Sensitivity to static impact No.

Protective Equipment and Precautions for Firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Personal Precautions: Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Ensure adequate ventilation. Avoid breathing vapors or mists. Avoid generation of dust.

Other Information: Refer to protective measures listed in Sections 7 & 8

Environmental Precautions

Environmental Precautions: Refer to protective measures listed in Sections 7 & 8.

Methods and Material for Containment and Cleaning Up

Methods for Containment: Prevent further leakage or spillage if safe to do so

Methods for Cleaning Up: Immediately place absorbent material in a sealed water-filled metal container to avoid spontaneous combustion of absorbent material contaminated with this product. Pick up and transfer to properly labeled containers.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Handling: Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Avoid breathing vapors or mists. Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Take off contaminated clothing and wash before reuse. Keep away from contact with clothing and other combustible materials to avoid fire.

Conditions for Safe Storage, Including any Incompatibilities

Storage: Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children.

Incompatible Products: None known based on information supplied

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	*ACGIH TLV*	*OSHA PEL*	*NIOSH IDLH*
Titanium dioxide 13463-67-7	TWA: 10 mg/m^3	TWA: 15 mg/m^3 total dust (vacated) TWA: 10 mg/m^3 total dust	IDLH: 5000 mg/m^3

ACGIH TLV: American Conference of Governmental Industrial Hygienists – Threshold Limit Value OSHA PEL: Occupational Safety and Health Administration – Permissible Exposure Limits NIOSH IDLH Immediately Dangerous to Life or Health

Other Exposure Guidelines: Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992). See section 15 for national exposure control parameters

Appropriate Engineering Controls

Engineering Measures: Showers / Eyewash Stations / Ventilation Systems

Individual Protection Measures, such as Personal Protective Equipment

Eye/Face Protection: If splashes are likely to occur, wear safety glasses with side shields (or goggles). None required for consumer use.

Skin and Body Protection: Wear protective gloves and protective clothing

Respiratory Protection: No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety practice. Take off contaminated clothing and wash before reuse. Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Viscous liquid	**Odor:**	Very Slight
Appearance:	White, clear or green	**Odor Threshold:**	No information available
Color:	No information available		

Property	**Values**	**Remarks/Method**
pH	8.5	None known
Melting/freezing point	No data available	None known
Boiling point/boiling range	No data available	None known
Flash Point	No data available	None known
Evaporation rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limit in Air		
Upper flammability limit	No data available	None known
Lower flammability limit	No data available	None known
Vapor pressure	No data available	None known
Vapor density	No data available	None known
Specific Gravity	No data available	None known
Water Solubility	Miscible in water	None known
Solubility in other solvents	No data available	None known
Partition coefficient: n-octanol/water	No data available	None known
Autoignition temperature	No data available	None known
Decomposition temperature	No data available	None known
Kinematic viscosity	No data available	None known
Dynamic viscosity	No data available	None known
Explosive properties	No data available	
Oxidizing properties	No data available	

Other Information

Softening Point	No data available
VOC Content (%)	No data available
Particle size	No data available
Particle size distribution	No data available

SECTION 10: STABILITY AND REACTIVITY

Reactivity
No data available

Conditions to Avoid
Excessive heat
Chemical Stability
Stable under recommended storage conditions

Incompatible Materials
None known based on information supplied

Possibility of Hazardous Reactions
None under normal processing

Hazardous Decomposition Products
Carbon oxides

Hazardous Polymerization
Hazardous polymerization does not occur

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Product Information: Product does not present an acute toxicity hazard based on known or supplied information

Inhalation: Specific test data for the substance or mixture is not available. May cause irritation of respiratory tract. Harmful by inhalation (based on components).

Eye Contact: Specific test data for the substance or mixture is not available. Expected to be an irritant based on components. May cause redness, itching, and pain. May cause temporary eye irritation.

Skin Contact: Specific test data for the substance or mixture is not available. May cause irritation. Prolonged contact may cause redness and irritation.

Ingestion: Specific test data for the substance or mixture is not available. Ingestion may cause irritation to mucous membranes. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Component Information

Chemical Name	*Oral LD50*	*Dermal LD50*	*Inhalation LC50*
Titanium dioxide 13463-67-7	> 10000 mg/kg (Rat)		

Information on Toxicological Effects

Symptoms: May cause redness and tearing of the eyes, coughing and/or wheezing, itching, rashes and hives.

Delayed and Immediate Effects as well as Chronic Effects from Short and Long-Term Exposure

Sensitization: May cause sensitization of susceptible persons. May cause sensitization by skin contact.

Mutagenic Effects: No information available.

Carcinogenicity: The table below indicates whether each agency has listed any ingredient as a carcinogen

Chemical Name	*ACGIH*	*IARC*	*NTP*	*OSHA*
Titanium dioxide 13463-67-7		Group 2B		X

ACGIH (American Conference of Governmental Industrial Hygienists)
A2 – Suspected Human Carcinogen
IARC (International Agency for Research on Cancer)
Group 2B – Possibly Carcinogenic to Humans
OSHA (Occupational Safety and Health Administration of the US Department of Labor)
X-Present

Reproductive Toxicity, STOT Single Exposure, STOT Repeated Exposure: No information available

Chronic Toxicity: Titanium dioxide has been classified by the International Agency for Research on Cancer (IARC) as possibly carcinogenic to humans (Group 2B) by inhalation. Contains a known or suspected carcinogen.

Target Organ Effects: Eyes, respiratory system, skin, gastrointestinal tract (GI) & lungs.

ATEmix (oral)
8,711.00 mg/kg
ATEmix (dermal)
21,608.00 mg/kg (ATE)
ATEmix (inhalation-gas)
3,118.00 ppm (4hr)
ATEmix (inhalation-dust/mist)
2.41 mg/l
ATEmix (inhalation-vapor)
16.00 ATEmix

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity: No data available

Persistence and Degradability: No information available

Bioaccumulation: No information available

Other Adverse Effects: No information available

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Treatment Methods

Disposal Methods: This material, as supplied, is not a hazardous waste according to Federal regulations (40 CFR 261). This material could become a hazardous waste if it is mixed with or otherwise comes in contact with a hazardous waste, if chemical additions are made to this material, or if the material is processed or otherwise altered. Consult 40 CFR 261 to determine whether the altered material is a hazardous waste. Consult the appropriate state, regional, or local regulations for additional requirements.

Contaminated Packaging: Dispose of contents/containers in accordance with local regulations

California Hazardous Waste Codes: 331

SECTION 14: TRANSPORT INFORMATION

DOT	Not Regulated
Proper Shipping Name	Non-Regulated
Hazard Class	N/A

TDG
No data available

IATA
No data available

IMDG/IMO
No data available

SECTION 15: REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	All components are listed either on the DSL or NDSL

TSCA – United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL – Canadian Domestic Substances List/Non-Domestic Substances List

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains no chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:

Chemical Name	*California Proposition 65*
Titanium dioxide – 13463-67-7	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	*New Jersey*	*Massachusetts*	*Pennsylvania*	*Rhode Island*	*Illinois*
Titanium dioxide – 13463-67-4	X	X	X		

International Regulations

Canada
WHMIS Hazard Class
D2A – Very toxic materials
D2B – Toxic materials



SECTION 16: OTHER INFORMATION

NFPA	Health Hazards 2	Flammability 0	Instability 0	Physical and Chemical Hazards Personal Protection
HMIS	Health Hazards 2*	Flammability 0	Physical Hazard 0	X

Chromic Hazard Star Legend * = Chronic Health Hazard

WARNING! If you scrape, sand or remove old paint, you may release lead dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear NIOSH-approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800-424-LEAD (5323) or log on to: www.epa.gov/lead

[FR Doc. 95–30797 Filed 12–18–95; 8:45 am]
BILLING CODE 6560–50–P

40 CFR Part 61

[FRL–5399–3]

Asbestos NESHAP Clarification Regarding Analysis of Multi-Layered Systems

AGENCY: Environmental Protection Agency.

ACTION: Notice of clarification to the final rule.

SUMMARY: This document provides clarification regarding the requirements of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for asbestos. It is intended to address common questions regarding situations where one or more layers which may contain asbestos are present, and supplement the January 5, 1994 Federal Register clarification (59 FR 542).

EFFECTIVE DATE: December 19, 1995.

FOR FURTHER INFORMATION CONTACT: For copies, contact Mr. Larry Tessier at 1–800–368–5888 or at (703) 305–5938. For questions about the clarification, please contact Mr. Tom Ripp at (202) 564–7003.

SUPPLEMENTARY INFORMATION: On November 20, 1990, the Federal Register published the Environmental Protection Agency's (the Agency's) revision of the National Emission Standards for Hazardous Air Pollutants for Asbestos (asbestos NESHAP), 40 CFR part 61, subpart M, 55 FR 48406. The asbestos NESHAP applies to any facility as defined in 40 CFR 61.141. The Agency has learned that some of the regulated community have further questions concerning the analysis of samples which may contain multiple layers, any or all of which may be asbestos containing materials (ACM) under the asbestos NESHAP. Because these questions are frequently asked, EPA is making this clarification.

I. Clarification of Multi-Layered ACM System

At the time the original asbestos NESHAP was promulgated (April 6, 1973), a standardized reference method had not been developed to determine quantitatively the content of asbestos in a material. The definition for ''friable asbestos material'' was added in the October 14, 1975 asbestos NESHAP, but still did not specify an analytical method. EPA's unwritten policy based on the definition of ''friable asbestos material'' was that each layer in a multi-layered system was to be analyzed as a separate material (no averaging or dilution by combining layers of asbestos-containing material with nonasbestos-containing material was allowed). The November 20, 1990 revision of the asbestos NESHAP finally specified that Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy (PLM method) be used to determine whether or not a material contains greater that one percent asbestos. Section 1.7.2.1 of the PLM method states that ''* * * When discrete strata are identified, each is treated as a separate material so that fibers are first quantified in that layer only, and then the results for each layer are combined to yield an estimate of asbestos content for the whole sample.'' This language has led to considerable confusion as to how to analyze multi-layered samples for NESHAP purposes. EPA published a clarification regarding the analysis of multi-layered systems in the January 5, 1994 Federal Register. This clarification basically stated that all multi-layered systems except for wall systems where joint compound was used only at the joints and nail holes must be analyzed as separate materials, and results were not allowed to be combined to determine average asbestos content (continuing the policy that dilution of an asbestos-containing material is not allowed).

The Environmental Protection Agency has received many questions about analyzing multi-layered systems for asbestos content to determine the applicability of the asbestos NESHAP since its January 5, 1994 clarification (59 FR 542). This clarification reiterates EPA's position for analysis of multi-layered samples for applicability of the asbestos NESHAP.

This clarification applies to all multi-layered systems (other than wallboard systems where asbestos-containing joint compound is used only at the joints and nail holes) under both the NESHAP and the Asbestos Hazard Emergency Response Act (AHERA) (40 CFR Part 763) programs.

Any source sending multi-layered bulk samples to a lab may request that certain sample(s) or portions of sample(s) be composited for analysis first (to potentially reduce time and cost of sampling).

(Note: A composite sample does not mean that multiple samples may be composited into one sample. It means that multiple layers of one core sample may be composited for analysis.)

If this alternative method is chosen, then the following requirements must be followed. To analyze the composite sample, the procedures in EPA/600–93/116 ''Method for the Determination of Asbestos in Bulk Building Materials'' (''the Method''), specifically Section 2.3 ''Gravimetry,'' must be used. Additionally, for the composite sample, the recommendations in Appendix D of the method must be followed. This procedure is consistent with the procedures outlined in 40 CFR Part 763, Appendix E to Subpart E (formerly Appendix A to Subpart F), which is referenced in the asbestos NESHAP (40 CFR 61.141 and 61.146), but the procedures in the new method are more clear. EPA finds that this method is an acceptable alternative method of compliance under section 61.13(h)(1)(ii). EPA intends to amend the asbestos NESHAP in the near future to refer specifically to these procedures. When using the gravimetric procedures, the result may be recorded as percent asbestos by weight.

If the result of the composite analysis shows that the average content for the multi-layered system (across the layers) is greater than one percent, then the multi-layered system must be treated as asbestos-containing and analysis by layers is not necessary. If the result of the composite sample analysis indicates that the multi-layered system as a whole contains asbestos in the amount of one percent or less, but greater than none detected, then analysis by layers is required to ensure that no layer in the system contains greater than one percent asbestos. If any layer contains greater than one percent asbestos, that layer must be treated as asbestos-containing. This will have the effect of requiring all layers in a multi-layered system to be treated as asbestos-containing if the layers can not be separated without disturbing the asbestos-containing layer. Once any one layer is shown to have greater than one percent asbestos, further analysis of the other layers is not necessary if all the layers will be treated as asbestos-containing. If several of the layers will be removed without removing the entire system, then all layers that will be disturbed must be analyzed. This includes the material being removed; however, the material being removed may be analyzed using the composite analysis procedures. Please note that the same requirements to perform point counting as stated in our May 8, 1991 clarification (see enclosed memorandum) still apply for any layers being analyzed individually.

Dated: September 28, 1995.

Richard Biondi,

Acting Director, Manufacturing, Energy, and Transportation Division, Office of Compliance.

[FR Doc. 95–30790 Filed 12–18–95; 8:45 am]

BILLING CODE 6560–50–P

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 73

[MM Docket No. 90–468; RM–7380]

Radio Broadcasting Services; Wickenburg and Lake Havasu City, AZ

AGENCY: Federal Communications Commission.

ACTION: Final rule; petition for reconsideration.

SUMMARY: This documents grants a Petition for Reconsideration filed by Interstate Broadcasting System of Arizona, Inc., licensee of Station KRDS-FM, Channel 287C2, Wickenburg, Arizona, directed to the *Report and Order* in this proceeding which had upgraded the Station KRDS-FM license to specify operation on Channel 287C1. *See* 56 FR 43884, September 5, 1991. With this action, the proceeding is terminated.

EFFECTIVE DATE: January 26, 1996.

FOR FURTHER INFORMATION CONTACT: Robert Hayne, Mass Media Bureau, (202) 776–1654.

SUPPLEMENTARY INFORMATION: This is a synopsis of the Commission's *Memorandum Opinion and Order* in MM Docket No. 90– 468, adopted December 6, 1995, and released December 12, 1995. The full text of this decision is available for inspection and copying during normal business hours in the FCC Reference Center (Room 239), 1919 M Street, NW., Washington, DC. The complete text of this decision may also be purchased from the Commission's copy contractor, International Transcription Service, Inc., (202) 857–3800, 1919 M Street, NW., Room 246, or 2100 M Street, NW., Suite 140, Washington, DC 20037.

List of Subjects in 47 CFR Part 73

Radio broadcasting.

Part 73 of title 47 of the Code of Federal Regulations is amended as follows:

PART 73—[AMENDED]

1. The authority citation for part 73 continues to read as follows:

Authority: Secs. 303, 48 Stat., as amended, 1082; 47 U.S.C. 154, as amended.

§ 73.202 [Amended]

2. Section 202(b), the Table of FM Allotments under Arizona, is amended by removing Channel 287C1 and adding Channel 287C2 at Wickenburg.

Federal Communications Commission.

Douglas W. Webbink,

Chief, Policy and Rules Division, Mass Media Bureau.

[FR Doc. 95–30757 Filed 12–18–95; 8:45 am]

BILLING CODE 6712–01–F

[Federal Register: August 1, 1994]

==========

DEPARTMENT OF ENERGY
ENVIRONMENTAL PROTECTION AGENCY

[OPPTS-62136; FRL-4744-1]

Advisory Regarding Availability of an Improved Asbestos Bulk Sample Analysis Test Method; Supplementary Information on Bulk Sample Collection and Analysis

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of advisory.

SUMMARY: This notice announces the availability of an improved asbestos bulk sample analysis test method for use with bulk samples collected for identification of asbestos-containing materials under the Asbestos Hazard Emergency Response Act (AHERA) regulations and the asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP). Supplementary information on the collection of bulk samples and analysis of these samples by the improved method is also provided.

FOR FURTHER INFORMATION CONTACT: Susan B. Hazen, Director, Environmental Assistance Division (7408), Office of Pollution Prevention and Toxics, Environmental Protection Agency, 401 M St., SW., Washington, DC 20460, Telephone: (202-554-1404), TDD: 554-0551.

SUPPLEMENTARY INFORMATION: EPA recently developed an improved test method entitled ``Method for the Determination of Asbestos in Bulk Building Materials'' (EPA/600/R-93/116). Copies of the test method are available by telephoning the National Technical Information Service (NTIS) at (800)553-6847. The NTIS identifier for the test method is PB93-218576.

The test method provides clarifications and improvements to the 1982 EPA ``Interim Method for the Determination of Asbestos in Bulk Insulation Samples'' (as found in 40 CFR part 763 Appendix A to Subpart F). Specifically, use of the improved method can provide more precise analytical results especially at low asbestos concentrations, enhanced analysis of floor tiles which may contain thin asbestos fibers below the limits of resolution of the polarized light microscope (PLM), and clearer instruction on the analysis of bulk materials, particularly where multiple layers are present.

The 1982 method is limited in that it does not provide guidance for analyzing materials that contain thin (<0.25 micrometers) asbestos

fibers. As a consequence, floor tiles which were analyzed according to the 1982 method and for which negative results were reported may actually contain undetected asbestos. At this time EPA does not have data to support identification of other materials which may have thin fibers.

The improved method addresses the thin fiber limitation of the 1982 method by providing directions for using transmission electron microscopy (TEM). The test method includes improved procedures for reducing matrices so that fibers may be made available for microscopic analysis. The improved method also directs laboratories to analyze the individual strata or layers and report a single result for each layer. The 1982 method provided that the analytical result for a multi-layered sample with discrete strata be reported as one result across all layers. Because the 1982 method allowed the result to be reported as one number, multi-layered samples which may contain asbestos in a single layer may have been reported by laboratories as nonasbestos-containing. The improved method directs laboratories to analyze and report a result for individual layers. Thus, more than one result will be reported for multi-layered samples, and a multi-layered sample which previously was determined to be nonasbestos-containing may now have layers which will be classified as asbestos-containing based on the presence of asbestos in greater than 1 percent.

In light of the availability of the improved method, EPA recommends that local education agencies (LEAs) use the improved method in place of the 1982 procedures as found in 40 CFR part 763 Appendix A to Subpart F. EPA has made the determination that the improved method is more capable of producing accurate results than the 1982 protocol and thus serves as a preferred substitute method. Further, EPA recommends that LEAs which have PLM laboratory results indicating floor tiles to be nonasbestos-containing (asbestos present in less than or equal to 1 percent) reconsider whether these materials may have thin asbestos fibers. LEAs should also consider whether other materials sampled previously may contain multiple layers, whether each of these layers was analyzed separately, and whether results were reported separately by layer. (Note: For purposes of this analysis, drywall or gypsum board is considered a single-layered material.) LEAs are encouraged to determine from sampling and analysis records whether multi-layered systems were sampled and analyzed separately. (A system is an integrated group of building components which form a unit, i.e., a wall system composed of a browncoat layer as well as other plaster layers.) Although there is no modification of the AHERA requirements at this time and results obtained by following the 1982 protocol and the AHERA sampling rules meet the AHERA legal requirements, it may be prudent for LEAs to assume floor tiles and multi-layered materials with previously negative results to be asbestos-containing or resample and analyze them by the 1993 EPA Test Method.

This approach should be considered for the following circumstances: (1) Floor tiles which may contain thin fibers and which were analyzed under the 1982 PLM method and found not to be asbestos-containing; and (2) materials such as hard wall and acoustical plaster, stucco or other similar multi-layered materials or systems which were not analyzed and reported by layers (discrete strata). LEAs are reminded that they are also required to comply with the asbestos NESHAP regulation when disturbing asbestos-containing building materials. Although building

owners/operators are not required by the asbestos NESHAP to collect bulk samples of building products prior to disturbance, they are responsible for knowing whether asbestos is contained in the building product. Often, identification of asbestos content may be obtained only by sampling and analyzing the material. EPA has provided guidance on how to sample and interpret analytical results for multi-layered samples for the asbestos NESHAP in the Federal Register notice of January 5, 1994 (59 FR 542). Before undertaking activities which might trigger asbestos NESHAP requirements, it is recommended that LEAs consider resampling multi-layered materials which have been found to be nonasbestos-containing for AHERA purposes or assume them to be asbestos-containing prior to disturbance according to the guidelines set forth in this current notice, in the January 5, 1994 NESHAP Federal Register notice, and in the improved analytical method to avoid potential violation of the asbestos NESHAP.

All previous positive results (asbestos present in greater than 1 percent) are acceptable regardless of the EPA method by which they were sampled or analyzed. For AHERA and NESHAP purposes, materials may always be assumed to be asbestos-containing in lieu of sampling and analysis.

EPA is in the midst of preparing a guidance bulletin to assist LEAs in implementing the recommendations discussed in this notice. The guidance will be available in summer 1994. To obtain a single copy of the bulletin, you must send a written request for the ``Asbestos Sampling Bulletin" and an 9\1/2\ inch by 12 inch self-addressed and stamped envelope (at least $0.75 in postage applied to the envelope) to: TSCA Assistance Information Service, Environmental Assistance Division (7408), Office of Pollution Prevention and Toxics, Environmental Protection Agency, 401 M St., SW., Washington, DC 20460. Requests for the bulletin that are not accompanied by the self-addressed and stamped envelope will not be honored. Multiple copies are not available. Copies will be distributed only in the previously described manner.

Dated: July 21, 1994.
Lynn R. Goldman,
Assistant Administrator, Office of Prevention, Pesticides and Toxic Substances.
[FR Doc. 94-18665 Filed 7-29-94; 8:45 am]
BILLING CODE 6560-50-F

Chapter 8: Control Options and Response Actions

CONTROL OPTIONS AND RESPONSE ACTIONS

Section:

Options for Controlling ACBMs

OPTIONS FOR CONTROLLING ASBESTOS-CONTAINING BUILDING MATERIALS

After the accredited asbestos inspector has identified the asbestos in a school building, the LEA and the management planner must utilize the information in the inspection report to decide what methods will be employed to manage and control the asbestos.

The AHERA rule offers the management planner at least two response action options for each type of material in a specific condition or state of repair. The management planner must then choose the option that will adequately "protect human health and the environment". If the management planner recommends two or more options, the LEA may choose the option that is least burdensome.

There are five response action categories specified in the rule: removal, encapsulation, enclosure, repair, and operations and maintenance. An explanation of the nature, and advantages and disadvantages of each option are offered below.

Removal

Removal of asbestos-containing building material (ACBM) is a matter of utilizing accredited individuals to perform a controlled, safe removal. Removal is not expressly required in the AHERA rule, except where it is determined by the management planner that no other control option will adequately protect human health and the environment.

The advantage of removal is simply that the material is gone when the project is successfully completed. With removal, maintenance, repair and reinspection costs are eliminated, the possibility of exposure from an accidental fiber release is eliminated, and the LEA is generally relieved of the burden of safely managing that material. It should also be kept in mind that ACBM must be removed from buildings prior to demolition. Accordingly, it may be less burdensome to remove the material during a renovation, or whenever resources are available, than to leave the ACBM in place.

The obvious disadvantage of removal is the initial cost. Those costs will be easier to justify if the long-term savings can be documented. Keep in mind that there is a tremendous potential for employee exposure and contamination of the general school environment if the project is not properly executed. Choose your contractor carefully.

Encapsulation

Encapsulation is the process of spraying or painting a binding or bridging material over a friable ACBM. Ideally the asbestos fibers are tied up in the encapsulation, thus preventing the fibers from becoming airborne. Typically, this alternative is used to reduce the likelihood of a fiber release from a sprayed-on or troweled-on surfacing material. This is not a practical alternative if the ACBM is not in good condition initially. If the surfacing material has begun to delaminate, the weight of the encapsulant may cause further damage. Encapsulation projects must be performed by accredited individuals.

Enclosure

Enclosure involves building a permanent or semi-permanent structure around an ACBM. The intention here is to separate the asbestos from the building occupants. Enclosure may be used in areas where accessibility and likelihood of disturbance of materials is high. Enclosures may be built around abandoned steam pipes in the rear of a classroom, for example, to prevent students from sticking pencils into the pipe insulation. The LEA may consider this an interim measure pending removal of the material during a building renovation. Enclosure must be performed by accredited individuals.

Repair

It should be remembered by the designee that ACBM that is maintained in good condition may not present a risk to building occupants. Those materials that are damaged can often be repaired. Typically repair will be advised for damaged thermal system insulation in boiler rooms, or for other situations where the material can be returned to its original condition. The initial cause of the damage should be rectified prior to repair to prevent reoccurrence. Small-scale repairs may be performed by properly trained school personnel.

Operations and Maintenance (O&M)

The operations and maintenance portion of the management plan will describe steps to maintain ACBM in a condition that will prevent fiber releases. The plan will also outline work practices and personnel protection measures for performing other maintenance that will result in the disturbance of ACBM.

The O&M plan may advise periodic painting of asbestos wallboard to prevent that material from becoming friable. The plan would also describe work practices such as wet methods, enclosures, and HEPA-vacuuming that would control fiber release if the wallboard were to be disturbed to gain access to wiring behind the wall for example. Personnel protective measures such as medical monitoring, protective clothing, and respiratory protective equipment for trained school employees performing tasks will also be specified.

It will be important for the designee to be familiar with the O&M plan. In most LEAs, the designee will be called by school maintenance personnel to describe what steps to take to perform a maintenance activity that may result in disturbance of ACBM. The designee should be able to extract the appropriate information from the plan, provide it to those who need it, and ensure that the prescribed procedures are followed.

Preventive Measures

Preventive measures may be advised where it is necessary to take steps to prevent the occurrence of damage or disturbance of ACBM that could result in a fiber release. Preventive measures are not response actions. These measures only provide extra steps the LEA may use in preventing damage to the ACBM.

For example, the management planner might advise an LEA to employ a policy that forbids school employees from putting holes in asbestos wallboard to hang pictures. Another example would be to install doorstops to prevent doors from damaging the walls.

Isolation is yet another example of a preventive measure. In the event of a fiber release, either emergency or on-going, the initial response the management planner may recommend is to isolate the area. Like enclosure, the object is to separate the ACBM from the building occupants. Isolation generally involves isolating access and airflow to a portion of a building such as a crawlspace or classroom.

Summary

It should be clear from reviewing the options for controlling ACBM, that there are alternatives to removal for the LEA. It must be emphasized; however, that those materials that are left in place must be properly managed to comply with the AHERA requirements, and more importantly to protect building occupants from the hazards associated with asbestos exposure.

Re-typed 7/2011
RLH

Chapter 9: Operation and Maintenance/Recordkeeping

OPERATIONS AND MAINTENANCE/ RECORDKEEPING

Sections:

Notification and Communication

Recordkeeping as Required by AHERA

Sample Forms

NOTIFICATION AND COMMUNICATION

The local education agency, as we have learned, is required to develop a management plan for each school. Included in the management plan is a description of steps taken to inform workers and building occupants, or their legal guardians, about inspections, reinspections, response actions, and post-response action activities, including reinspections and periodic surveillance activities that are planned or in progress [Section 763.93(e)(10)]. Additionally, the LEA is required to notify in writing parent, teacher, and employee organizations of the availability of the management plan when the management plan is submitted to the Governor (State designee) and at least once every school year thereafter [Section763.93(g)(4)].

The purpose of the availability of the management plan is to enable the public to determine if the LEA has implemented the management plan satisfactorily. Consequently, in the event that an LEA has all ACM removed from a school building, the annual written notification to parents, teachers, and other school employees remains in effect. With regard to the annual notification requirement, its purpose is to ensure that parents and employees new to the LEA each year have an opportunity to be informed about the availability of the plan.

With respect to the acceptable methods or forms of written public notifications, the LEAs have a great deal of flexibility. A letter to the PTA and the employee's union is acceptable. However, Section 763.93(g)(4) requires the LEA to include in the management plan a description of the steps to notify such organizations and a dated copy of the notification.

In the absence of any such formal organizations for parents, teachers, or employees, the LEA must still notify parents, teachers, and employees in writing. As stated on page 41841 of the rule's preamble, in some instances this notification could take the form of a newspaper advertisement, an article in a LEA newsletter, or some other form. LEA's unsure about how to properly notify these groups should contact their EPA Regional Asbestos Coordinator. Here too, LEAs must include in the management plan a description of the steps taken to notify such organizations and a dated copy of the notification.

Beyond the informational and notification requirements, the local education agency is faced with the fundamental need for a sound public relations effort when dealing with asbestos. Credibility is what the school administrator and LEA designee is seeking in a public relations effort. Informational flow should begin before the inspection process to establish credibility and be reinforced by timely updates as further information becomes available for distribution. Presenting the logic and rationale ahead of any decision point may encourage cooperation.

The local education agency should inform building workers and occupants about the location and physical condition of the ACM that they might disturb, and stress the need to avoid disturbing the material. Occupants should be notified for two reasons: (19) building occupants should be informed of any potential hazard in their vicinity; and (2) informed persons are less likely to unknowingly disturb the material and cause fibers to be released into the air.

The best approach to handling public, employee, and building occupant relations when dealing with asbestos involves three principles:

-Bring it up early.
-Tell the truth
-Communicate with all affected parties

Early disclosure is key to establishing and maintaining credibility. Disclosure can begin before the inspection is done or the results are known and can include the following elements:

-Inspection activity
-Purpose of inspection – to determine whether asbestos is present
-Information available – upon receipt of lab results
-Possible response actions
-Concern for maintaining safe environment
-Person/office to contact for additional information.

It is in the best interests of the LEA or building owner to schedule any announcements or distribute written notices to building occupants or workers simultaneously. Whatever its form, the information given to building occupants and workers should contain the following points to the extent they reflect building conditions:

- ACM has been found in the building and is located in areas where the material could be disturbed.

- The condition of the ACM, and the response action which is appropriate for that condition.

- Asbestos only presents a health hazard when fibers become airborne and are inhaled. The mere presence of ACM does not represent a health hazard.

- The ACM is found in the following locations (e.g., ceilings in Rooms 101 and G-323, walls in the lobby, above suspended ceilings in the first floor corridor, on columns in the main entry, on pipes in the boiler room).

- Do not disturb the ACM (e.g., do not push furniture against the ACM, do not damage TSI)

- Report any evidence of disturbance or damage of ACM to (name, location, and phone number of LEA Designee/Asbestos Program Manager).

- Report any dust or debris that might come from the ACM or suspect ACM, any change in the condition of the ACM, or any improper action (relative to ACM) of building personnel to (name, location, and phone number of LEA Designee/Asbestos Program Manager).

- Cleaning and maintenance personnel are taking special precautions during their work to properly clean up any asbestos debris and to guard against disturbing ACM.

- All ACM is inspected periodically and additional measures will be taken if needed to protect the health of building occupants.

It is important to undertake an honest and open approach to the ACM notification procedure. The LEA designee and building owners should strive to establish clear lines of communication with all building occupants and workers regarding asbestos issues. People who are informed of the presence, location and condition of ACM in a building where they work or live, who understand that the mere presence of ACM is not necessarily hazardous to them, and who accept that ACM can often be managed effectively in place, can be very helpful to the owner in eliminating or reducing hysteria on the part of other less informed building occupants. On the other hand, if occupants suspect the building owner is not being honest about asbestos activities in the building, that owner's credibility may be questioned and the situation can become far more difficult to manage. If and when asbestos incidents occur, it is especially important for the building owner to deal with occupants and contractors openly and honestly, for that is the best way to maintain occupant/tenant confidence in both the owner and the building's asbestos program.

Source: 40 CFR Part 763, Subpart E: Asbestos-Containing Materials in Schools: Final Rule and Notice, Model Curriculum for the Asbestos Inspector, EPA's 100 Commonly Asked Questions About the New AHERA Asbestos-in-Schools Rule, and EPA's Managing Asbestos in Place: A Building Owner's Guide to Operations and Maintenance Programs for Asbestos-Containing Materials**.**

Re-typed 7/2011
RLH

NOTICE TO CONTRACTORS

REFERENCE: ASBESTOS CONTAINING BUILDING MATERIALS (ACBM)

In accordance with EPA, AHERA, and Federal regulations, this school facility has been inspected for ACBM which contain asbestos in either the FRIABLE or NON-FRIABLE form.

ACBM is present at this school facility:

School Name

School Address

A record of the inspection and a diagram of location(s) of ACBM are available at:

ALL PERSONS (i.e., Contractors, public or private or individuals) doing work in or around the above named facility must validate by the signature of this form their acknowledgement of the presence of ACBM.

COMPANY NAME:

ADDRESS:

TYPE OF WORK:

DATE OF WORK ON PREMISES:

SIGNATURE OF ACKNOWLEDGEMENT DATE

THIS FORM SHOULD BE RETURNED TO:

RECORDKEEPING AS REQUIRED BY AHERA

Responsibility for Recordkeeping

An effective management plan is dependent upon a comprehensive recordkeeping system. The local education agency (LEA) as required by 763.93(a)(1) and (e) develops an asbestos management plan for each school and utilizes an accredited management planner to develop such a plan. The plan developed by the management planner presents the results of the building inspection, the assessment of ACBM found in the building, a discussion of recommended response options the LEA should implement to manage the ACBM, recommendations regarding prioritization of those response actions, plans for reinspection, operations and maintenance activities and periodic surveillance, description of steps to inform the appropriate groups about the response actions, and an evaluation of the resources needed to complete the response actions. A copy of this LEA's management plan is submitted to the Governor's State designee.

Each LEA is required to keep in its administrative office a copy of the management plan that was submitted to the Governor's State designee. If changes are made based on the State review, each LEA is required to keep the revised management plan on file in the LEA office. In addition, each school is required to keep a copy of its own management plan. Records of all activities performed after the original plan was submitted to the Governor's State designee must be collected and made available to the public for inspection. The public may request the LEA to provide all information gathered during inspections, reinspections and periodic surveillance, as well as general information regarding the LEA's asbestos control program [Section 763.93(g)].

It is the LEA's responsibility to establish a recordkeeping system and maintain the required records as part of its management plan [Section 763.93(h)].

Reasons and Benefits of Recordkeeping

The purpose of the recordkeeping process is to establish and maintain a standardized system, which clearly documents implementation of an asbestos control program. The steps taken by the LEA to identify asbestos material and associated hazards, and minimize the potential exposure to employees and building occupants must be recorded for future reference.

The reasons for maintaining complete and detailed records of asbestos management are many. Documentation can expedite response actions and make future renovation in any facility easier. The legal liabilities involved with asbestos are another reason to maintain thorough records. The more thorough the documentation, the more defensible the actions taken. Furthermore, poor or sloppy recordkeeping could imply callousness toward employees, building occupants, and the public. In the case of LEA's, records are kept because they are required by AHERA.

AHERA is specific regarding the various records and documentary information to be maintained. Section 763.94 outlines the records to be provided and maintained as part of the LEA's management plan.

Elements of Recordkeeping

In general, the recordkeeping system must track three types of data: 1) data on the physical condition of the ACBM, 2) actions taken on the ACBM, and 3) the data associated with the personnel involved with the asbestos management program.

Records must be kept of all relevant events occurring after submission of the management plan. These records become part of the management plan. The relevant events include:

1. Preventive measures and response actions
2. Air sampling
3. Training of personnel
4. Periodic surveillance
5. Cleaning activities
6. Small-scale, short-duration operations and maintenance activities
7. All other operations and maintenance activities
8. Fiber release episodes
9. Reinspection and assessment

All records shall be retained in the administrative offices of both the LEA and the school as part of the management plan. For each area where ACBM has been removed, the records must be kept for 3 years after the next required reinspection [Section 763.94(a)].

The tracking of the ACBM's may be thought of as the tracking of a business's physical inventory requiring that the condition of the material be checked at intervals (record of the surveillance), the recording of substantive changes in material status (removal, enclosure, encapsulation, or repair), various required reports to governing bodies (notices of abatement and disposal actions to the EPA and state offices), and the recording of an up-to-date inventory on a three-year schedule (reinspections).

Required recordkeeping for personnel includes identity, training, medical monitoring and exposure levels. This information should be recorded on a form, which will be available for a period of at least 30 years.

The various records and documentary information to be included in the recordkeeping system is outlined below.

1. For each preventive measure and response action taken for friable and non-friable ACBM, friable and non-friable suspected ACBM, and assumed to be ACM [Section 763.94(b)(1)]:
   -Detailed written description of the measure or action;
   -Methods used;
   -Location;
   -Justification why a specific measure or action was selected;
   -Start and completion dates of all work;
   -Names and addresses of all contractors involved, accreditation information; and
   -If ACBM was removed, the name and location of storage or disposal site.

2. For any air sampling conducted [Section763.94(b)(2)]:
   -Name and signature of person collecting samples;
   -Location(s) where samples were collected;
   -Date of collection;
   -Name and address of laboratory analyzing samples;
   -Date and method of analysis;
   -Results of analysis;
   -Name and signature of analyst, and
   -Statement that laboratory is recognized by the appropriate entity.

3. For persons required to be trained for maintenance and repair operations, training records must be maintained [Section763.94(c)]:
   -Employee's name and job title;
   -Date training completed;
   -Location of training and training organization's name; and
   -Number of hours of training.

4. For each time periodic surveillance is performed [Section 763.94(d)];
   -Inspector's name;
   -Date of the surveillance; and
   -Notation of changes (or lack thereof) in the condition of the ACBM.

5. For each time that cleaning is performed [Section 763.94(e)]:
   -Name of person(s) doing cleaning;
   -Date of cleaning;
   -Locations cleaned; and
   -Methods used in cleaning.

6. For each time small-scale, short-duration, operations and maintenance activities are performed [Section 763.94(f)]:
   -Name of person(s) performing activities;
   -Start and completion dates of activities;
   -Locations;
   -Description of each activity, including preventive measures taken; and
   -If ACBM removed, name and location of storage or disposal site.

7. For each time maintenance activities other than small-scale, short-duration activities are undertaken [Section 763.94(g)]:
   -Name, signature, State of accreditation, and accreditation number if applicable for each person involved in activity;
   -Start and completion dates of project;
   -Locations;
   -Description of project, including preventative measures taken; and
   -If ACBM removed, name and location of storage or disposal site.

8. For each fiber release episode [Section 763.94(h)]:
   -Date of episode;
   -Location;
   -Method of repair, preventive measures or response action taken;
   -Name(s) of person(s) performing work; and
   -If ACBM was removed, name and location of storage or disposal site.

9. For each reinspection [Section 763.85(b)(3)(vii)]:
   -Name and accreditation information of the inspector;
   -Date of inspection; and
   -Any changes (or lack thereof) noted in the condition of the ACBM.

10. Suggested, but not required, documentation:
   -Complete historical blueprint of facility, if available;
   -Documentation on materials/products used in construction or renovation of the facility that may contain asbestos(include any correspondence with manufacturers):
   -Location and photographs of warning signs and barriers placed to prevent unauthorized access to areas of ACBM;
   -Required state and federal forms dealing with notification and compliance;
   -All correspondence pertaining to asbestos in the facility, and
   -Copies of notification statements, press releases, meeting agenda (with attendance roster).

The following documents are example record and report forms:

Occupant Information Record
Worker Training Record
Work Medical Surveillance Record
Reinspection of Asbestos-Containing Materials
Job Request Form for Maintenance Work
Maintenance Work Authorization form
Evaluation of Work Affecting Asbestos-Containing Materials
Periodic Surveillance Report
Fiber Release Episode Report

Source: 40 CFR Part 763 Asbestos-Containing Materials in Schools: Final Rule and Notice, Model Curriculum for the Management Planner and EPA's Asbestos-in-Schools: A Guide to New Federal Requirements for Local Education Agencies.

Re-Typed 7/2011
RLH

FIBER RELEASE EPISODE REPORT

1. Address, building, and room number(s), or description of area, where episode occurred: _

_____

_____

_____

2. The release episode was reported by _____ on _____ (date).

3. Describe the episode: _____

_____

_____

_____

_____

_____

_____

_____

4. The asbestos-containing material ___was ___was not cleaned up according to approved procedures. Describe the cleanup: _____

_____

_____

_____

_____

_____

_____

Signed: _____ Date: _____

(Asbestos Program Manager)

FIBER RELEASE EPISODE REPORT

BUILDING:_____ LOCATION: _____

DATE OF FIBER RELEASE EPISODE: _____

DESCRIPTION OF FIBER RELEASE EPISODE: _____

_____

_____

_____

METHOD OF REPAIR: _____

_____

_____

WORKER INFORMATION:

Name:_____ Job Title: _____

Name:_____ Job Title: _____

Name:_____ Job Title: _____

Name:_____ Job Title: _____

PREVENTIVE MEASURES AND RESPONSE ACTIONS TAKEN:

If Response Actions are performed, they must be designed and performed by accredited personnel other than small-scale, short-duration repairs. Use form titled Preventive Measure and Response Action Form to document these activities.

NAME AND LOCATION OF DISPOSAL SITE: (IF ACBM IS REMOVED OR CLEANED UP)

_____

REMARKS: _____

_____

_____

_____

PREVENTIVE MEASURE AND RESPONSE ACTION FORM

BUILDING: _____ LOCATION: _____

Description of Preventive Measure or Response Action: _____

_____

_____

Reasons for Preventive Measure or Response Action: _____

_____

_____

Starting Date: _____ Completion Date: _____

Contractor's Name and Address: _____

_____

_____

Name and Location of Disposal Site: _____

Worker Information:

Name: _____ Title: _____ DHS No. _____

Name: _____ Title: _____ DHS No. _____

Name: _____ Title: _____ DHS No. _____

Name: _____ Title: _____ DHS No. _____

If DHS numbers do not exist, furnish date of training, location of training, and number of hours of training course At least one person above must be a Supervisor.

DESIGNER INFORMATION (if project is greater than 3 square feet of 3 linear feet)

Name: _____ Title: _____ DHS No. _____

AIR MONITORING INFORMATION (if project is greater than 160 sq. ft. or 260 linear feet)
Attach Air Monitoring firm statement, including signature, locations, date.
Attach Lab Statement, including lab name and address, analysis results, method of analysis, analyst's name and address, and statement that lab meets AHERA requirements.

OCCUPANT INFORMATION RECORD

DOCUMENT NUMBER: _____ DATE: _____

RECEIPT ACKNOWLEDGING THAT I HAVE BEEN INFORMED OF THE PRESENCE OF ASBESTOS-CONTAINING BUILDING MATERIALS IN:

_____ _____

Building Number and Name Building Location

I FURTHER ACKNOWLEDGE THAT THE INFORMATION PROVIDED TO ME INCLUDED THE FOLLOWING:

1. THE LOCATIONS OF ASBESTOS–CONTAINING MATERIALS TO WHICH I MIGHT HAVE ACCESS IN THE NORMAL COURSE OF MY PRESENCE IN THE BUILDING.

2. THE HAZARDS TO HEALTH PRESENTED BY ASBESTOS.

3. APPROPRIATE BEHAVIOR IN THE PRESENCE OF ASBESTOS-CONTAINNG MATERALS WHICH WILL PREVENT OR REDUCE THE POTENTIAL HAZARD.

4. NOTIFICATION PROCEDURES WHICH I MUST FOLLOW IN THE EVENT I OBSERVE A POSSIBLE CHANGE IN THE CONDITION OF ANY OF THE ASBESTOS-CONTAINING MATERIALS.

5. SAFETY PROCEDURES WHICH I AM TO FOLLOW IN THE EVENT OF AN EMERGENCY WHICH MIGHT INVOLVE THE ASBESTOS-CONTAINING MATERIALS.

MY REASON FOR BEING IN THE BUILDING IS: _____

_____

_____

My Signature in acknowledgement of the above_____

Printed Name _____

Employer Name, Address and Phone Number _____

_____

_____

Exhibit 1

Sample Asbestos Inspection Disclosure

(Date)

_____ (The School Board/Building Owner) is undertaking a survey of its/his/her buildings to determine if any of the buildings'' materials contain asbestos. Asbestos has been widely used in building construction. The (board/Owner) believes that a complete survey of all facilities is the most prudent approach to assuring protection to all personnel and building occupants.

Within the new/few months inspectors will be visiting this building to inspect for suspect materials. To determine whether suspect materials contain asbestos, samples must be collected and submitted for laboratory analysis. Please cooperate in every way with them. IN the unlikely event that asbestos discovered, action will be taken to maintain safe conditions.

You may see the inspector wearing a respirator. This is a precautionary measure designed to provide the inspection with protection from any exposure that he or she may accumulated during hundreds of inception and sampling operations.

If you have any questions about the survey, please contact:

_____ (name and phone number).

WORKER TRAINING RECORD

INDIVIDUAL'S NAME

INDIVIDUAL'S IDENTIFICATION NUMBER

PERMANENT STREET ADDRESS

EMERGENCY CONTACT PERSON

PERMANENT CITY, STATE AND ZIP

EMERGENCY CONTACT PHONE NUMBER

HOME PHONE NUMBER

ATTENDING PHYSICIAN

ATTENDING PHYSICIAN PHONE NUMBER

ASBESTOS TRAINING HISTORY

COURSE DATE	COURSE LOCATION	COURSE TITLE	TRAINING CENTER NAME	HRS OF INSTRUCTION	CERT NUMBER

THIS INDIVIDUAL IS QUALIFIED TO PERFORM THE FOLLOWING TYPE(S) OF ASBESTOS-RELATED WORK:

____ 1. RESTRICTED TO MAINTENANCE WORK WHICH DOES NOT INVOLVE THE DISTURBANCE OF ASBESTOS-CONTAINING BUILDING MATERIALS
____ 2. MAY PERFORM SMALL-SCALE, SHORT-DURATION WORK AS DEFINED BY THE APPLICABLE RULES AND REGULATIONS, UNDER PROPER SUPERVISION.
____ 3. MAY PERFORM SMALL-SCALE, SHORT-DURATION WORK AS DEFINED BY THE RULES AND REGULATIONS, AND IS QUALIFIED TO SUPERVISE OTHER WORKERS PERFORMING THE SAME TYPE OF WORK.
____ 4. MAY PERFORM WORK IN ANY TYPE OF ASBESTOS REMOVAL PROJECT UNDER PROPER SUPERVISION.
____ 5. MAY PERFORM WORK ON ANY TYPE OF ASBESTOS REMOVAL PROJECT AND IS QUALIFIED TO SUPERVISE OTHERS PERFORMING THE SAME TYPE OF WORK.

Signature

Title

Date

WORKER MEDICAL SURVEILLANCE RECORD

INDIVIDUAL'S NAME

INDIVIDUAL'S IDENTIFICATION NUMBER

PERMANENT STREET ADDRESS

EMERGENCY CONTACT PERSON

PERMANENT CITY, STATE AND ZIP

EMERGENCY CONTACT PHONE NUMBER

HOME PHONE NUMBER

ATTENDING PHYSICIAN

ATTENDING PHYSICIAN PHONE NUMBER

RESPIRATOR FIT TESTING

MEDICAL APPROVALS		TEST CONDUCTED BY	DATE	MANUFACTURER'S DATA	
DATE	PHYSICIAN			MAKE	MODEL

MEDICAL EXAMINATION HISTORY

DATE	PHYSICIAN	TYPE OF EXAM	REASON	RESULTS ON FILE AT LOCATION

SAMPLE RECORD KEEPING FORMS

Form 1. A sample form for recording information during asbestos-containing materials (ACM) reassessment.

Reinspection of Asbestos-Containing Materials

Location of asbestos-containing material (address, building, room, or general description): _____

_____

_____

_____

Type of asbestos-containing material(s):
1. Sprayed- or troweled-on ceilings or walls
2. Sprayed- or troweled-on structural members
3. Insulation on pipes, tanks, or boiler
4. Other (describe): _____

_____

Abatement Status:
1. The material has been encapsulated____, enclosed____, neither__ __, removed____.

Assessment:
1. Evidence of physical damage: _____

_____

2. Evidence of water damage: _____

_____

3. Evidence of delamination or other damage: _____

_____

4. Degree of accessibility of the material: _____

_____

5. Degree of activity near the material: _____

_____

6. Location in an air plenum, air shaft, or airstream: _____

_____

7. Other observations (including the condition of the encapsulan t or enclosure, if any): _____

_____

Recommended Action: _____

_____

Signed: _____ Date: _____
(evaluator) A

Form 2. A sample application form for maintenance work approval.

Job Request Form for Maintenance Work

Name: _____ Date: _____

Telephone No.: _____ Job Request No.: _____

Requested starting date: _____ Anticipated finish date: _____

Address, building, and room number(s) (or description of area) where work is to be performed:

_____

_____

_____

_____

Description of work:

_____

_____

_____

_____

Description of any asbestos-containing material that might be affected, if known (include location and type):

_____

_____

_____

_____

Name and telephone number of requestor:

_____

Name and telephone number of supervisor:

_____

Submit this application to:

_____

(Asbestos Program Manager)

NOTE: An application should be submitted for all maintenance work whether or not asbestos-containing material might be affected. An authorization should be received before any work can proceed.

____ Granted (Job Request No._____)
____ With conditions*
____ Denied

* Conditions: _____

_____

Form 3. A sample maintenance work authorization form

Maintenance Work Authorization Form

No. _____

Authorization

Authorization is given to proceed with the following maintenance work: _____

Presence of Asbestos-Containing Materials (ACM)

_____ Asbestos-containing materials (ACM) are not present in the vicinity of th e maintenance work.

_____ ACM is present, but its disturbance is not anticipat ed; however, if conditions change, the Asbestos Program Manager will re-evaluate the work request prior to proceeding.

_____ ACM is present, and may be disturbed.

Work Practices if Asbestos-Containing Materials are Present

The following work practices shall be employed to avoid or minimize disturbing asbestos: _____

Personal Protection if Asbestos-Containing Materials are Present

The following equipment/clothes shall be used/worn during the work to protect workers: _____

(manuals on personal protection can be referenced)

Special Practices and/or Equipment Required: _____

Signed: _____ Date: _____

(Asbestos Program Manager)

Form 4. A sample work evaluation form

Evaluation of Work Affecting Asbestos-Containing Materials

This evaluation covers the following maintenance work:
Location of work (address, building, room number(s), or general description):_____

_____

_____

_____

Date(s) of work: _____

Description of work: _____

Work approval form number: _____

Evaluation of work practices employed to minimize disturbance of asbestos: _____

_____

_____

_____

_____

_____

Evaluation of work practices employed to contain released fibers and to clean up the work area: _____

_____

_____

_____

_____

_____

Evaluation of equipment and procedures used to protect workers: _____

_____

_____

_____

_____

_____

Personal air monitoring results (in-house worker or contract?):

Worker Name_____ Results _____

Worker Name_____ Results _____

Handling or storage of ACM waste _____

Signed: _____ Date:_____

(Asbestos Program Manager)

AHERA PERIODIC SURVEILLANCE FORM

SCHOOL/FACILITY:_____

DATE OF SURVEILLANCE:_____

PERSON PERFORMING SURVEILLANCE:_____

ALL AREAS IDENTIFIED IN THE MANAGEMENT PLAN AS ACBM OR ASSUMED ACBM HAS BEEN VISUALLY INSPECTED AT THE ABOVE SCHOOL/FACILITY AND THE FINDINGS ARE AS FOLLOWS:

_____ NO CHANGE _____ CHANGE (Describe in detail)

DESCRIPTION OF ANY CHANGE:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

COPY OF THIS REPORT FORWARDED TO THE AHERA DESIGNEE ON _____(date)

_____

SIGNATURE OF PERSON PERFORMING SURVEILLANCE

- -FOR DESIGNEE USE ONLY -

PERIODIC SURVEILLANCE REPORT RCVD BY THE AHERA DESIGNEE ON _____(date).
COPIES OF THIS FORM FORWARDED ON _____ (date) TO THE FOLLOWING:

_____SCHOOL/FACILITY _____MAINTENANCE DEPT _____LEA

FOR INCLUSION IN THE MANAGEMENT PLAN MANUAL

DATE_____ _____

SIGNATURE – AHERA DESIGNEE

PERIODIC SURVEILLANCE REPORT

RETURN COMPLETED FORM TO ASBESTOS PROGRAM MANAGER

PAGE_____ OF_____ **DATE_____**

DOCUMENT NUMBER	BUILDING NUMBER AND NAME	ACM SPACE NUMBER AND NAME
	BUILDING LOCATION	IF THE STATUS OF THE ACBM HAS CHANGED THEN PHOTOGRAPH THE AREA AND RECORD THE PHOTOGRAPH NUMBER IN THE SPACE PROVIDED. NOTIFY THE ASBESTOS PROGRAM MANAGER CONCERNING THE CHANGE.

Sample Area, Lot or Salient ID	Sample Area/Lot or Salient Description	Last Material Condition			Change		New Photo	Notes
		T	DC	PD	Yes	No		

_____ _____

Signature of person completing report **Title of Person Completing Report**

T = Material type:
S = Surfacing
M = Miscellaneous
T = Thermal Systems

DC = Damage Condition:
NO = No Damage
D = Damage
SD = Significant Damage

PD = Potential Damage Categories:
NPD = No Potential Damage
PD = Potential Damage
PSD = Potential Sig. Damage

Chapter 10: AHERA Compliance Inspections

AHERA COMPLIANCE INSPECTIONS

Sections:

EPA TSCA Notice of Inspection- Form 7740-3

EPA TSCA Inspection Summary of Observations

US ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

TOXIC SUBSTANCES CONTROL ACT

NOTICE OF INSPECTION

1. INVESTIGATION IDENTIFICATION			3. FACILITY NAME
DATE	INSPECTOR'S NO.	DAILY SEQ. NO.	
2. INSPECTOR'S ADDRESS			4. FACILITY ADDRESS

For Internal EPA Use. Copies may be provided to recipient as acknowledgment of this notice.

REASON FOR INSPECTION

Under the authority of Section 11 of the Toxic Substances Control Act:

☒ For the purpose of inspection (including taking samples, photographs, statements, and other inspection activities) an establishment, facility, or other premises in which chemical substances or mixtures, articles containing same are manufactured, processed, stored or held before or after their distribution in commerce (including records, files, papers, processes, controls, and facilities) and any conveyances being used to transport chemical substances, mixtures, or articles containing same in connection with their distribution in commerce (including records, files, papers, processes, controls, and facilities) bearing on whether the requirements of the Act are applicable to the chemical substances, mixtures, or articles within, or associated with, such premise or conveyance have been complied with.

☐ In addition, this inspection extends to (check appropriate blocks):

- ☐ A. Financial data
- ☐ B. Sales data
- ☐ C. Pricing data
- ☐ D. Personnel data
- ☐ E. Research data

The nature and extent of inspection of such data specified in A through E above is as follows:

INSPECTOR'S SIGNATURE		RECIPIENT'S SIGNATURE	
NAME		NAME	
TITLE	DATE SIGNED	TITLE	DATE SIGNED

U.S. ENVIRONMENTAL PROTECTION AGENCY
TSCA INSPECTION
SUMMARY OF OBSERVATIONS

Name and Address of Inspector(s)	**Facility Name and Address (LEA)**
	Responsible Party (Name)
	Responsible Party (Title)

The following potential deviations from the requirements of the Toxic Substances Control Act and regulations promulgated thereto were observed during this inspection.

____ LEA APPEARS to be in compliance with AHERA
____ LEA failed to conduct an AHERA inspection pursuant to 40 CFR Part 763
____ LEA failed to develop a management plan pursuant to 40 CFR Part 763
____ LEA failed to use accredited persons
____ LEA failed to designate a person to ensure that the responsibilities of AHERA are carried out as defined in the regulations
____ LEA failed to provide initial or annual notifications to parent/teacher/employee organizations
____ LEA failed to notify short term workers
____ LEA failed to conduct periodic surveillance
____ LEA failed to conduct three-year reinspection
____ LEA failed to provide training for designated person, custodial or maintenance staff
____ LEA failed to post proper warning labels
____ LEA failed to sample or adequately sample suspect ACBM
____ LEA failed to inspect each building and identify all ACBM
____ LEA failed to ensure proper completion and/or document response actions
____ LEA failed to update management plan.
____ LEA failed to maintain required records
____ LEA failed to submit exclusion letter(s) for new construction

____ Other:_____
____ Other:_____

This Summary of Observations is provided to bring to your attention those areas of concern at the current time. It is not intended to be a complete list of potential deviations from the requirements of the Toxic Substances Control Act and regulations thereto, but rather a list of those conditions of immediate concern and/or readily apparent.

The undersigned acknowledges having received and read a copy of this TSCA Summary of Observations.

Inspector's Name		Recipient's Name	
Signature		Signature	
Title	Date	Title	Date

Revised 10/09

Chapter 11: Legal Issues

LEGAL ISSUES

Sections:

Legal Implications of Asbestos Management
Legal Liability
Selecting and Negotiating with Asbestos Contractors

LEGAL IMPLICATIONS OF ASBESTOS MANAGEMENT

This section will discuss the responsibilities of various parties involved in the management and control of asbestos-containing materials. Due to the numerous federal, state, county and even municipal laws, rules and regulations which may be applicable, and which are increasing, the discussion by necessity is generalized. The reader must plan technically as well as legally, and obtain competent legal advice addressed to the particular situation, which is being faced. This material should serve merely as a guide to legal issues that are involved, and is not to be considered as legal advice.

Legally, the building owner has the primary responsibility for the abatement of hazards within any structure, including asbestos. Under general legal principles, a building owner who either knows or should have known that asbestos exists in a building, and that it is likely to be hazardous to those exposed to it, may be liable to the building's inhabitants. This theory is based on the fact that the building owner has a common law (and sometimes statutory) responsibility to invitees and licensees. Further, once the owner suspects or has reasons to suspect that asbestos may be present on the property, any extended delay in determining whether a hazard exists or in instituting an asbestos management or abatement program increases the owner's chances of being found negligent in a personal injury suit. It is also important to realize that the owner may be subjected to liability if he fails to institute a safe and effective plan for asbestos control, which could decrease the dangers on the property. In summary, an owner can be held liable if he knew, or should have known, that asbestos was present and creating a dangerous condition, and then failed to take appropriate action or took improper or incomplete actions. The persons who may be injured can include employees of the owner, personnel and contractors, persons who come into the property (business visitors, delivery persons), and the public.

Common examples of the above principle are the maintenance programs that building owners have on an ongoing basis in connection with wet floors, snow removal, leaking roofs, etc. Just as these occurrences can cause dangerous conditions, so too can the presence of friable asbestos-containing materials. And, just as owners have their maintenance staff continually on the lookout for wet floors so that these can be dried, and programs to alert tenants and others to the dangers, so too must these principles be applied to the presence of asbestos-containing materials.

The building owner will also generally be held negligent for the actions of an employee acting within the course and scope of his employment. In addition, responsibility for an activity, which is inherently dangerous, cannot generally be delegated. The building owner will thus retain responsibility for an asbestos management or abatement program if it is performed by his employees. The responsibility may, in some situations, be shifted to contractors hired by the owner to conduct an asbestos control program; in some situations, an employer will not be liable for the negligence of an independent contractor, although the owner would be liable for the same negligent acts if committed by an employee. However, in order to minimize liability, building owners must be extremely careful in structuring a transaction with an independent asbestos abatement

contractor. If the engagement is not properly structured, a building owner may be held jointly liable with an abatement contractor for any negligence on the part of the contractor. It is also essential that a building owner exercise reasonable care in selecting asbestos consultants and abatement contractors who are competent and qualified. If proper care is not taken in choosing competent professionals and contractors, the owner may not have properly discharged his legal obligation.

Finally, a building owner is generally under an affirmative obligations to exercise reasonable care inspecting and maintaining a building. Therefore, in addition to developing and instituting an asbestos management or abatement program if hazards are found, the building owner has an affirmative duty to warn persons who may be affected by the danger and to take adequate temporary and permanent measures to control the hazard.

In summary, the responsibility for potential asbestos exposure in a building rests with the building owner. An owner cannot discharge this responsibility by avoiding it. In addition, owners of public buildings, especially schools, are under direction to take certain actions. Both statutes and regulations should be continually reviewed by such owners, and others involved in developing abatement plans, to determine their responsibilities. For example, the Asbestos School Hazard Abatement Act of 1984 provides for information distribution, technical and scientific assistance, and significant financial support to identify and abate asbestos hazards in schools. The Asbestos Hazard Emergency Response Act (AHERA) of 1986 directed the U.S. Environmental Protection Agency to issue regulations for addressing asbestos problems in elementary and secondary, public and private schools, including inspections, reinspections and periodic surveillance, development of management plans, implementation of response actions, accreditation of persons performing asbestos management activities, and protection of maintenance and custodial personnel and occupants of schools. It is expected that such requirements may ultimately be extended to non-school public buildings and private buildings.

It is necessary to understand that the mere presence of asbestos may not pose a danger, unless fibers are being released into the air. This release can occur due to a variety of reasons, including degradation of existing materials due to age, or the disturbing of areas containing friable asbestos-containing materials. Thus, even if the asbestos-containing materials in a building do not presently constitute a hazard, a demolition, renovation, routine maintenance or remodeling project which is undertaken without an awareness of the potential hazards can become a health and legal disaster. In such cases, persons who work on such projects and employees and visitors in the building may be unnecessarily exposed to asbestos; in addition, projects may be stopped completely due to the intervention of federal and state agencies charged with enforcing existing regulations, and the project and owner may be subjected to fines as well as adverse media publicity. Ignorance or disregard of the potential problems can be far more expensive, both business-wise and legally, than adherence to proper standards of care.

Legal Liability

"Liability" does not mean only one kid of financial obligation; it may refer to any of the three different kinds:

Criminal Liability
Regulatory Liability
Civil Liability

Criminal liability would arise from violation of a statute, such as the National Emissions Standards for Hazardous Air Pollutants (NESHAP). Statutes impose criminal punishments for actions that disobey its provisions, such as intentionally discharging visible emissions. Such statutes may impose fines or imprisonment or both.

Regulatory liability is imposed through the operations of governmental regulatory agencies. Some agencies have limited powers, and their authority may extend only to suspending or revoking a license previously granted. Others have broader powers and may be authorized to impose monetary penalties for violation of their regulations. Both EPA and OSHA have such authority. They can charge an offender with violation of administrative regulations, hold a hearing before an agency hearing officer, and impose an administrative fine directly.

Civil liability differs from the other two in that it primarily arises out of controversies between private parties and is imposed through lawsuits brought by private parties. Most of the rules that govern civil liability do not come from statutes passed by legislation. Instead, they are derived from the written opinions of judges in previous cases that are called "The Common Law."

Civil liability arising out of asbestos abatement is most likely to arise under two sets of Common Law rules, those governing contracts and torts.

A contract is a legally enforceable agreement. Typically a contract involves a promise by one party to provide goods or services and a promise by the other to pay a specified amount of money for them. If either party fails to live up to the promise, the other is entitled to recover the sum of money that will put him/her where he or she would have been if the defaulter had lived up to the promise. For example, if an abatement contractor fails to perform at the contract price, the building owner is entitled to hire another contractor of comparable skills at the lowest price reasonably obtainable and sue the non-performing contractor for the difference between the contract price and the price actually paid.

Some contract controversies result from outright, intentional failure to perform. Most, however, result from disagreements between the parties about what the contract's terms mean. Such problems can be reduced by careful reading and written clarification of the proposed contract before signing.

Tort comes from the French word meaning "wrong." In English it is defined as a "civil wrong for which the law provides a remedy of money damages." Judicial precedents have established that a tort consists of three elements:

the courts must have previously defined a "duty" or rule of conduct,
there must be a breach of duty, and
the breach must have caused an injury or damage to the person bringing the complaint.

The duty that underlines tort liability in connection with abatement is called the "duty of reasonable care."

SELECTING A CONTRACTOR

Meet with the INDIVIDUAL(S) that will be performing the services.

Confirm contractor accreditation

- NC accreditation number
- All employees and subcontractors accredited
- Confirm accreditation number with HHCU staff
- Accreditation is the MINIMUM requirement

Evaluate ability and performance

- Experience the individual(s) to perform the service?
- Has the individual previously performed asbestos related services?
- Has the individual performed AHERA related services?
- Ask to see previous work
- Ask for names of previous clients you may contact
- Discuss details regarding how the work will be performed

Evaluate Contractor Accessibility

- Readily available for emergency response (i.e. major fiber release)?
- Accessible for interpretations or to answer general questions?
- Available to represent the LEA in public meetings, in dealings with the media, etc.?

DEVELOPING A CONTRACT

Who will perform services?

- Are only accredited individuals to be involved?
- Will subcontractors be used?

What services will be performed?

- Inspection and management plan?
- Are sample collection and analysis included in the price?
- Training to be included, or available?
- Contract for APPROVED services (i.e., approved management plan, approved removal job)

When will services be performed?

- Inspections performed during non-school hours
- Management plan submitted by deadline date
- Abatement performed during summer months

Evaluate Contractor's Insurance

Get legal assistance

COST FACTORS

Staff Member vs. General Contractor to inspect and write the Management Plan

- Initial in-house cost is less to hire contractor (training and accreditation cost of staff member may be close to $1000; more if cost of 3 months of training required for accreditation is included)
- Implementation cost of the plan may be greater if not well-written.
- Inspection/sampling analysis costs may be higher if the inspector is less experienced.

Size of the Contract

- Cost per square foot decreases as the size of the contract increases.
- Small schools or school systems may combine to increase the size of the contract.

Sample or Assume?

- Assuming that a material is ACBM saves on sampling costs.
- Incorrect assumptions will increase the cost of implementation probably beyond the cost of sampling.

Chapter 12: EPA Regulations

EPA REGULATIONS

Sections:

Toxic Substance Control Act (TSCA), Title II
Asbestos Hazard Emergency Response Act (AHERA), Public Law 99-519, October 22, 1986

Asbestos-Containing Materials in Schools; Final Rule, 40 CFR Part 763, Subpart E, October 30, 1987 INCLUDING Model Accreditation Plan (MAP), 40 CFR Part 763, Subpart E, Appendix C, February 3, 1994

Asbestos-Containing Materials in Schools; Final Rule, 40 CFR Part 763, Subpart E, Appendix B, Work Practices and Engineering Controls for Small-Scale, Short-Duration Operations Maintenance and Repair (O&M) Activities Involving ACM

National Emissions Standard for Hazardous Air Pollutants (NESHAP), Asbestos Standard, November 20, 1990

TOXIC SUBSTANCE CONTROL ACT (TSCA)

The TSCA authorizes the EPA to develop adequate data regarding the effect of toxic substances on the health and the environment and to adopt regulations for these toxic substances. The Asbestos Hazard Emergency Response Act (AHERA) of 1986 amends TSCA. It establishes detailed regulatory requirements for the EPA asbestos-in-school program. On October 30, 1987 the EPA issued final regulations (40 CFR Part 763) under AHERA.

SUMMARY OF 40 CFR PART 763

- Identify friable and nonfriable asbestos-containing materials in public and private elementary and secondary schools by visual inspection;
- Sample such materials if they are not assumed to be asbestos-containing and have samples analyzed;
- Submit management plans or required for deferral to the State by October 12, 1988;
- Submit all management plans to the State by May 9, 1989;
- Being to implement management plans by July 9, 1989;
- Complete implementation of the management plans in a timely fashion;
- Designate and train a person in each LEA to administer this program;
- Maintain a good faith effort to protect public health and the environment, and
- Maintain records at each school and the LEA administrative office.

uary 1, 1978, and on or before January 1 of each succeeding year a comprehensive report on the administration of this chapter during the preceding fiscal year. Such reports shall include—

(1) a list of the testing required under section 2603 of this title during the year for which the report is made and an estimate of the costs incurred during such year by the persons required to perform such tests;

(2) the number of notices received during such year under section 2604 of this title, the number of such notices received during such year under such section for chemical substances subject to a rule, and a summary of any action taken during such year under section 2604(g) of this title;

(3) a list of rules issued during such year under section 2605 of this title;

(4) a list, with a brief statement of the issues, of completed or pending judicial actions under this chapter and administrative actions under section 2615 of this title during such year;

(5) a summary of major problems encountered in the administration of this chapter; and

(6) such recommendations for additional legislation as the Administrator deems necessary to carry out the purposes of this chapter.

(Pub. L. 94–469, title I, § 30, Oct. 11, 1976, 90 Stat. 2050; renumbered title I, Pub. L. 99–519, § 3(c)(1), Oct. 22, 1986, 100 Stat. 2989.)

TERMINATION OF REPORTING REQUIREMENTS

For termination, effective May 15, 2000, of provisions in this section relating to submitting annual report to Congress, see section 3003 of Pub. L. 104–66, as amended, set out as a note under section 1113 of Title 31, Money and Finance, and page 163 of House Document No. 103–7.

SUBCHAPTER II—ASBESTOS HAZARD EMERGENCY RESPONSE

§ 2641. Congressional findings and purpose

(a) Findings

The Congress finds the following:

(1) The Environmental Protection Agency's rule on local educational agency inspection for, and notification of, the presence of friable asbestos-containing material in school buildings includes neither standards for the proper identification of asbestos-containing material and appropriate response actions with respect to friable asbestos-containing material, nor a requirement that response actions with respect to friable asbestos-containing material be carried out in a safe and complete manner once actions are found to be necessary. As a result of the lack of regulatory guidance from the Environmental Protection Agency, some schools have not undertaken response action while many others have undertaken expensive projects without knowing if their action is necessary, adequate, or safe. Thus, the danger of exposure to asbestos continues to exist in schools, and some exposure actually may have increased due to the lack of Federal standards and improper response action.

(2) There is no uniform program for accrediting persons involved in asbestos identification and abatement, nor are local educational agencies required to use accredited contractors for asbestos work.

(3) The guidance provided by the Environmental Protection Agency in its ''Guidance for Controlling Asbestos-Containing Material in Buildings'' is insufficient in detail to ensure adequate responses. Such guidance is intended to be used only until the regulations required by this subchapter become effective.

(4) Because there are no Federal standards whatsoever regulating daily exposure to asbestos in other public and commercial buildings, persons in addition to those comprising the Nation's school population may be exposed daily to asbestos.

(b) Purpose

The purpose of this subchapter is—

(1) to provide for the establishment of Federal regulations which require inspection for asbestos-containing material and implementation of appropriate response actions with respect to asbestos-containing material in the Nation's schools in a safe and complete manner;

(2) to mandate safe and complete periodic reinspection of school buildings following response actions, where appropriate; and

(3) to require the Administrator to conduct a study to find out the extent of the danger to human health posed by asbestos in public and commercial buildings and the means to respond to any such danger.

(Pub. L. 94–469, title II, § 201, as added Pub. L. 99–519, § 2, Oct. 22, 1986, 100 Stat. 2970.)

§ 2642. Definitions

For purposes of this subchapter—

(1) Accredited asbestos contractor

The term ''accredited asbestos contractor'' means a person accredited pursuant to the provisions of section 2646 of this title.

(2) Administrator

The term ''Administrator'' means the Administrator of the Environmental Protection Agency.

(3) Asbestos

The term ''asbestos'' means asbestiform varieties of—

(A) chrysotile (serpentine),
(B) crocidolite (riebeckite),
(C) amosite (cummingtonite-grunerite),
(D) anthophyllite,
(E) tremolite, or
(F) actinolite.

(4) Asbestos-containing material

The term ''asbestos-containing material'' means any material which contains more than 1 percent asbestos by weight.

(5) EPA guidance document

The term ''Guidance for Controlling Asbestos-Containing Material in Buildings'', means the Environmental Protection Agency document with such title as in effect on March 31, 1986.

(6) Friable asbestos-containing material

The term ''friable asbestos-containing material'' means any asbestos-containing material

applied on ceilings, walls, structural members, piping, duct work, or any other part of a building which when dry may be crumbled, pulverized, or reduced to powder by hand pressure. The term includes non-friable asbestos-containing material after such previously non-friable material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

(7) Local educational agency

The term ''local educational agency'' means—

(A) any local educational agency as defined in section 7801 of title 20,

(B) the owner of any private, nonprofit elementary or secondary school building, and

(C) 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.).

(8) Most current guidance document

The term ''most current guidance document'' means the Environmental Protection Agency's ''Guidance for Controlling Asbestos-Containing Material in Buildings'' as modified by the Environmental Protection Agency after March 31, 1986.

(9) Non-profit elementary or secondary school

The term ''non-profit elementary or secondary school'' means any elementary or secondary school (as defined in section 7801 of title 20) owned and operated by one or more nonprofit corporations or associations no part of the net earnings of which inures, or may lawfully inure, to the benefit of any private shareholder or individual.

(10) Public and commercial building

The term ''public and commercial building'' means any building which is not a school building, except that the term does not include any residential apartment building of fewer than 10 units.

(11) Response action

The term ''response action'' means methods that protect human health and the environment from asbestos-containing material. Such methods include methods described in chapters 3 and 5 of the Environmental Protection Agency's ''Guidance for Controlling Asbestos-Containing Materials in Buildings''.

(12) School

The term ''school'' means any elementary or secondary school as defined in section 7801 of title 20.

(13) School building

The term ''school building'' means—

(A) 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,

(B) any gymnasium or other facility which is specially designed for athletic or recreational activities for an academic course in physical education,

(C) any other facility used for the instruction of students or for the administration of educational or research programs, and

(D) any maintenance, storage, or utility facility, including any hallway, essential to the operation of any facility described in subparagraphs (A), (B), or (C).

(14) State

The term ''State'' means a State, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Northern Marianas, the Trust Territory of the Pacific Islands, and the Virgin Islands.

(Pub. L. 94–469, title II, § 202, as added Pub. L. 99–519, § 2, Oct. 22, 1986, 100 Stat. 2971; amended Pub. L. 103–382, title III, § 391(c)(1)–(3), Oct. 20, 1994, 108 Stat. 4022; Pub. L. 107–110, title X, § 1076(f)(1), Jan. 8, 2002, 115 Stat. 2091.)

REFERENCES IN TEXT

The Defense Dependents' Education Act of 1978, referred to in par. (7)(C), is title XIV of Pub. L. 95–561, Nov. 1, 1978, 92 Stat. 2365, as amended, which is classified principally to chapter 25A (§ 921 et seq.) of Title 20, Education. For complete classification of this Act to the Code, see Short Title note set out under section 921 of Title 20 and Tables.

AMENDMENTS

2002—Pars. (7)(A), (9), (12). Pub. L. 107–110 substituted ''7801'' for ''8801''.

1994—Pars. (7)(A), (9), (12). Pub. L. 103–382 made technical amendment to reference to section 8801 of title 20 to reflect change in reference to corresponding section of original act.

EFFECTIVE DATE OF 2002 AMENDMENT

Amendment by Pub. L. 107–110 effective Jan. 8, 2002, except with respect to certain noncompetitive programs and competitive programs, see section 5 of Pub. L. 107–110, set out as an Effective Date note under section 6301 of Title 20, Education.

TERMINATION OF TRUST TERRITORY OF THE PACIFIC ISLANDS

For termination of Trust Territory of the Pacific Islands, see note set out preceding section 1681 of Title 48, Territories and Insular Possessions.

§ 2643. EPA regulations

(a) In general

Within 360 days after October 22, 1986, the Administrator shall promulgate regulations as described in subsections (b) through (i) of this section. With respect to regulations described in subsections (b), (c), (d), (e), (f), (g), and (i) of this section, the Administrator shall issue an advanced notice of proposed rulemaking within 60 days after October 22, 1986, and shall propose regulations within 180 days after October 22, 1986. Any regulation promulgated under this section must protect human health and the environment.

(b) Inspection

The Administrator shall promulgate regulations which prescribe procedures, including the use of personnel accredited under section 2646(b) or (c) of this title and laboratories accredited under section 2646(d) of this title, for determining whether asbestos-containing material is present in a school building under the authority

of a local educational agency. The regulations shall provide for the exclusion of any school building, or portion of a school building, if (1) an inspection of such school building (or portion) was completed before the effective date of the regulations, and (2) the inspection meets the procedures and other requirements of the regulations under this subchapter or of the ''Guidance for Controlling Asbestos-Containing Materials in Buildings'' (unless the Administrator determines that an inspection in accordance with the guidance document is inadequate). The regulations shall require inspection of any school building (or portion of a school building) that is not excluded by the preceding sentence.

(c) Circumstances requiring response actions

(1) The Administrator shall promulgate regulations which define the appropriate response action in a school building under the authority of a local educational agency in at least the following circumstances:

(A) Damage

Circumstances in which friable asbestos-containing material or its covering is damaged, deteriorated, or delaminated.

(B) Significant damage

Circumstances in which friable asbestos-containing material or its covering is significantly damaged, deteriorated, or delaminated.

(C) Potential damage

Circumstances in which—

(i) friable asbestos-containing material is in an area regularly used by building occupants, including maintenance personnel, in the course of their normal activities, and

(ii) there is a reasonable likelihood that the material or its covering will become damaged, deteriorated, or delaminated.

(D) Potential significant damage

Circumstances in which—

(i) friable asbestos-containing material is in an area regularly used by building occupants, including maintenance personnel, in the course of their normal activities, and

(ii) there is a reasonable likelihood that the material or its covering will become significantly damaged, deteriorated, or delaminated.

(2) In promulgating such regulations, the Administrator shall consider and assess the value of various technologies intended to improve the decisionmaking process regarding response actions and the quality of any work that is deemed necessary, including air monitoring and chemical encapsulants.

(d) Response actions

(1) In general

The Administrator shall promulgate regulations describing a response action in a school building under the authority of a local educational agency, using the least burdensome methods which protect human health and the environment. In determining the least burdensome methods, the Administrator shall take into account local circumstances, including occupancy and use patterns within the school building and short- and long-term costs.

(2) Response action for damaged asbestos

In the case of a response action for the circumstances described in subsection (c)(1)(A) of this section, methods for responding shall include methods identified in chapters 3 and 5 of the ''Guidance for Controlling Asbestos-Containing Material in Buildings''.

(3) Response action for significantly damaged asbestos

In the case of a response action for the circumstances described in subsection (c)(1)(B) of this section, methods for responding shall include methods identified in chapter 5 of the ''Guidance for Controlling Asbestos-Containing Material in Buildings''.

(4) Response action for potentially damaged asbestos

In the case of a response action for the circumstances described in subsection (c)(1)(C) of this section, methods for responding shall include methods identified in chapters 3 and 5 of the ''Guidance for Controlling Asbestos-Containing Material in Buildings'', unless preventive measures will eliminate the reasonable likelihood that the asbestos-containing material will become damaged, deteriorated, or delaminated.

(5) Response action for potentially significantly damaged asbestos

In the case of a response action for the circumstances described in subsection (c)(1)(D) of this section, methods for responding shall include methods identified in chapter 5 of the ''Guidance for Controlling Asbestos-Containing Material in Buildings'', unless preventive measures will eliminate the reasonable likelihood that the asbestos-containing material will become significantly damaged, deteriorated, or delaminated.

(6) "Preventive measures" defined

For purposes of this section, the term ''preventive measures'' means actions which eliminate the reasonable likelihood of asbestos-containing material becoming damaged, deteriorated, or delaminated, or significantly damaged[1] deteriorated, or delaminated (as the case may be) or which protect human health and the environment.

(7) EPA information or advisory

The Administrator shall, not later than 30 days after November 28, 1990, publish and distribute to all local education agencies and State Governors information or an advisory to—

(A) facilitate public understanding of the comparative risks associated with in-place management of asbestos-containing building materials and removals;

(B) promote the least burdensome response actions necessary to protect human health, safety, and the environment; and

(C) describe the circumstances in which asbestos removal is necessary to protect human health.

Such information or advisory shall be based on the best available scientific evidence and

[1] So in original. Probably should be followed by a comma.

shall be revised, republished, and redistributed as appropriate, to reflect new scientific findings.

(e) Implementation

The Administrator shall promulgate regulations requiring the implementation of response actions in school buildings under the authority of a local educational agency and, where appropriate, for the determination of when a response action is completed. Such regulations shall include standards for the education and protection of both workers and building occupants for the following phases of activity:

(1) Inspection.

(2) Response Action.[2]

(3) Post-response action, including any periodic reinspection of asbestos-containing material and long-term surveillance activity.

(f) Operations and maintenance

The Administrator shall promulgate regulations to require implementation of an operations and maintenance and repair program as described in chapter 3 of the ''Guidance for Controlling Asbestos-Containing Materials in Buildings'' for all friable asbestos-containing material in a school building under the authority of a local educational agency.

(g) Periodic surveillance

The Administrator shall promulgate regulations to require the following:

(1) An identification of the location of friable and non-friable asbestos in a school building under the authority of a local educational agency.

(2) Provisions for surveillance and periodic reinspection of such friable and non-friable asbestos.

(3) Provisions for education of school employees, including school service and maintenance personnel, about the location of and safety procedures with respect to such friable and non-friable asbestos.

(h) Transportation and disposal

The Administrator shall promulgate regulations which prescribe standards for transportation and disposal of asbestos-containing waste material to protect human health and the environment. Such regulations shall include such provisions related to the manner in which transportation vehicles are loaded and unloaded as will assure the physical integrity of containers of asbestos-containing waste material.

(i) Management plans

(1) In general

The Administrator shall promulgate regulations which require each local educational agency to develop an asbestos management plan for school buildings under its authority, to begin implementation of such plan within 990 days after October 22, 1986, and to complete implementation of such plan in a timely fashion. The regulations shall require that each plan include the following elements, wherever relevant to the school building:

(A) An inspection statement describing inspection and response action activities carried out before October 22, 1986.

(B) A description of the results of the inspection conducted pursuant to regulations under subsection (b) of this section, including a description of the specific areas inspected.

(C) A detailed description of measures to be taken to respond to any friable asbestos-containing material pursuant to the regulations promulgated under subsections (c), (d), and (e) of this section, including the location or locations at which a response action will be taken, the method or methods of response action to be used, and a schedule for beginning and completing response actions.

(D) A detailed description of any asbestos-containing material which remains in the school building once response actions are undertaken pursuant to the regulations promulgated under subsections (c), (d), and (e) of this section.

(E) A plan for periodic reinspection and long-term surveillance activities developed pursuant to regulations promulgated under subsection (g) of this section, and a plan for operations and maintenance activities developed pursuant to regulations promulgated under subsection (f) of this section.

(F) With respect to the person or persons who inspected for asbestos-containing material and who will design or carry out response actions with respect to the friable asbestos-containing material, one of the following statements:

(i) If the State has adopted a contractor accreditation plan under section 2646(b) of this title, a statement that the person (or persons) is accredited under such plan.

(ii) A statement that the local educational agency used (or will use) persons who have been accredited by another State which has adopted a contractor accreditation plan under section 2646(b) of this title or is accredited pursuant to an Administrator-approved course under section 2646(c) of this title.

(G) A list of the laboratories that analyzed any bulk samples of asbestos-containing material found in the school building or air samples taken to detect asbestos in the school building and a statement that each laboratory has been accredited pursuant to the accreditation program under section 2646(d) of this title.

(H) With respect to each consultant who contributed to the management plan, the name of the consultant and one of the following statements:

(i) If the State has adopted a contractor accreditation plan under section 2646(b) of this title, a statement that the consultant is accredited under such plan.

(ii) A statement that the contractor is accredited by another State which has adopted a contractor accreditation plan under section 2646(b) of this title or is accredited pursuant to an Administrator-approved course under section 2646(c) of this title.

(I) An evaluation of resources needed to successfully complete response actions and

[2] So in original. Probably should not be capitalized.

carry out reinspection, surveillance, and operation and maintenance activities.

(2) Statement by contractor

A local educational agency may require each management plan to contain a statement signed by an accredited asbestos contractor that such contractor has prepared or assisted in the preparation of such plan, or has reviewed such plan, and that such plan is in compliance with the applicable regulations and standards promulgated or adopted pursuant to this section and other applicable provisions of law. Such a statement may not be signed by a contractor who, in addition to preparing or assisting in preparing the management plan, also implements (or will implement) the management plan.

(3) Warning labels

(A) The regulations shall require that each local educational agency which has inspected for and discovered any asbestos-containing material with respect to a school building shall attach a warning label to any asbestos-containing material still in routine maintenance areas (such as boiler rooms) of the school building, including—

(i) friable asbestos-containing material which was responded to by a means other than removal, and

(ii) asbestos-containing material for which no response action was carried out.

(B) The warning label shall read, in print which is readily visible because of large size or bright color, as follows: **"CAUTION: ASBESTOS. HAZARDOUS. DO NOT DISTURB WITHOUT PROPER TRAINING AND EQUIPMENT."**

(4) Plan may be submitted in stages

A local educational agency may submit a management plan in stages, with each submission of the agency covering only a portion of the school buildings under the agency's authority, if the agency determines that such action would expedite the identification and abatement of hazardous asbestos-containing material in the school buildings under the authority of the agency.

(5) Public availability

A copy of the management plan developed under the regulations shall be available in the administrative offices of the local educational agency for inspection by the public, including teachers, other school personnel, and parents. The local educational agency shall notify parent, teacher, and employee organizations of the availability of such plan.

(6) Submission to State Governor

Each plan developed under this subsection shall be submitted to the State Governor under section 2645 of this title.

(j) Changes in regulations

Changes may be made in the regulations promulgated under this section only by rule in accordance with section 553 of title 5. Any such change must protect human health and the environment.

(k) Changes in guidance document

Any change made in the ''Guidance for Controlling Asbestos-Containing Material in Buildings'' shall be made only by rule in accordance with section 553 of title 5, unless a regulation described in this section dealing with the same subject matter is in effect. Any such change must protect human health and the environment.

(*l*) Treatment of Department of Defense schools

(1) Secretary to act in lieu of Governor

In the administration of this subchapter, any function, duty, or other responsibility imposed on a Governor of a State shall be carried out by the Secretary of Defense with respect to 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.).

(2) Regulations

The Secretary of Defense, in cooperation with the Administrator, shall, to the extent feasible and consistent with the national security, take such action as may be necessary to provide for the identification, inspection, and management (including abatement) of asbestos in any building used by the Department of Defense as an overseas school for dependents of members of the Armed Forces. Such identification, inspection, and management (including abatement) shall, subject to the preceding sentence, be carried out in a manner comparable to the manner in which a local educational agency is required to carry out such activities with respect to a school building under this subchapter.

(m) Waiver

The Administrator, upon request by a Governor and after notice and comment and opportunity for a public hearing in the affected State, may waive some or all of the requirements of this section and section 2644 of this title with respect to such State if it has established and is implementing a program of asbestos inspection and management that contains requirements that are at least as stringent as the requirements of this section and section 2644 of this title.

(Pub. L. 94–469, title II, § 203, as added Pub. L. 99–519, § 2, Oct. 22, 1986, 100 Stat. 2972; amended Pub. L. 101–637, § 13, Nov. 28, 1990, 104 Stat. 4593.)

REFERENCES IN TEXT

The Defense Dependents' Education Act of 1978, referred to in subsec. (*l*)(1), is title XIV of Pub. L. 95–561, Nov. 1, 1978, 92 Stat. 2365, as amended, which is classified principally to chapter 25A (§ 921 et seq.) of Title 20, Education. For complete classification of this Act to the Code, see Short Title note set out under section 921 of Title 20 and Tables.

AMENDMENTS

1990—Subsec. (d)(7). Pub. L. 101–637 added par. (7).

§ 2644. Requirements if EPA fails to promulgate regulations

(a) In general

(1) Failure to promulgate

If the Administrator fails to promulgate within the prescribed period—

(A) regulations described in section 2643(b) of this title (relating to inspection);

(B) regulations described in section 2643(c), (d), (e), (f), (g), and (i) of this title (relating to responding to asbestos); or

(C) regulations described in section 2643(h) of this title (relating to transportation and disposal);

each local educational agency shall carry out the requirements described in this section in subsection (b); subsections (c), (d), and (e); or subsection (f); respectively, in accordance with the Environmental Protection Agency's most current guidance document.

(2) Stay by court

If the Administrator has promulgated regulations described in paragraph (1)(A), (B), or (C) within the prescribed period, but the effective date of such regulations has been stayed by a court for a period of more than 30 days, a local educational agency shall carry out the pertinent requirements described in this subsection in accordance with the Environmental Protection Agency's most current guidance document.

(3) Effective period

The requirements of this section shall be in effect until such time as the Administrator promulgates the pertinent regulations or until the stay is lifted (as the case may be).

(b) Inspection

(1) Except as provided in paragraph (2), the local educational agency, within 540 days after October 22, 1986, shall conduct an inspection for asbestos-containing material, using personnel accredited under section 2646(b) or (c) of this title and laboratories accredited under section 2646(d) of this title, in each school building under its authority.

(2) The local educational agency may exclude from the inspection requirement in paragraph (1) any school building, or portion of a school building, if (A) an inspection of such school building (or portion) was completed before the date on which this section goes into effect, and (B) the inspection meets the inspection requirements of this section.

(c) Operation and maintenance

The local educational agency shall, within 720 days after October 22, 1986, develop and begin implementation of an operation and maintenance plan with respect to friable asbestos-containing material in a school building under its authority. Such plan shall provide for the education of school service and maintenance personnel about safety procedures with respect to asbestos-containing material, including friable asbestos-containing material.

(d) Management plan

(1) In general

The local educational agency shall—

(A) develop a management plan for responding to asbestos-containing material in each school building under its authority and submit such plan to the Governor under section 2645 of this title within 810 days after October 22, 1986,

(B) begin implementation of such plan within 990 days after October 22, 1986, and

(C) complete implementation of such plan in a timely fashion.

(2) Plan requirements

The management plan shall—

(A) include the elements listed in section 2643(i)(1) of this title, including an inspection statement as described in paragraph (3) of this section,[1]

(B) provide for the attachment of warning labels as described in section 2643(i)(3) of this title,

(C) be prepared in accordance with the most current guidance document,

(D) meet the standard described in paragraph (4) for actions described in that paragraph, and

(E) be submitted to the State Governor under section 2645 of this title.

(3) Inspection statement

The local educational agency shall complete an inspection statement, covering activities carried out before October 22, 1986, which meets the following requirements:

(A) The statement shall include the following information:

(i) The dates of inspection.

(ii) The name, address, and qualifications of each inspector.

(iii) A description of the specific areas inspected.

(iv) A list of the laboratories that analyzed any bulk samples of asbestos-containing material or air samples of asbestos found in any school building and a statement describing the qualifications of each laboratory.

(v) The results of the inspection.

(B) The statement shall state whether any actions were taken with respect to any asbestos-containing material found to be present, including a specific reference to whether any actions were taken in the boiler room of the building. If any such action was taken, the following items of information shall be included in the statement:

(i) The location or locations at which the action was taken.

(ii) A description of the method of action.

(iii) The qualifications of the persons who conducted the action.

(4) Standard

The ambient interior concentration of asbestos after the completion of actions described in the most current guidance document, other than the type of action described in sections 2643(f) of this title and subsection (c) of this section, shall not exceed the ambient exterior concentration, discounting any contribution from any local stationary source. Either a scanning electron microscope or a transmission electron microscope shall be used to determine the ambient interior concentration. In the absence of reliable measurements, the ambient exterior concentration shall be deemed to be—

[1] So in original. Probably should be ''subsection,''.

(A) less than 0.003 fibers per cubic centimeter if a scanning electron microscope is used, and

(B) less than 0.005 fibers per cubic centimeter if a transmission electron microscope is used.

(5) Public availability

A copy of the management plan shall be available in the administrative offices of the local educational agency for inspection by the public, including teachers, other school personnel, and parents. The local educational agency shall notify parent, teacher, and employee organizations of the availability of such plan.

(e) Building occupant protection

The local educational agency shall provide for the protection of building occupants during each phase of activity described in this section.

(f) Transportation and disposal

The local educational agency shall provide for the transportation and disposal of asbestos in accordance with the most recent version of the Environmental Protection Agency's ''Asbestos Waste Management Guidance'' (or any successor to such document).

(Pub. L. 94–469, title II, §204, as added Pub. L. 99–519, §2, Oct. 22, 1986, 100 Stat. 2977.)

§ 2645. Submission to State Governor

(a) Submission

Within 720 days after October 22, 1986 (or within 810 days if there are no regulations under section 2643(i) of this title), a local educational agency shall submit a management plan developed pursuant to regulations promulgated under section 2643(i) of this title (or under section 2644(d) of this title if there are no regulations) to the Governor of the State in which the local educational agency is located.

(b) Governor requirements

Within 360 days after October 22, 1986, the Governor of each State—

(1) shall notify local educational agencies in the State of where to submit their management plans under this section, and

(2) may establish administrative procedures for reviewing management plans submitted under this section.

If the Governor establishes procedures under paragraph (2), the Governor shall designate to carry out the reviews those State officials who are responsible for implementing environmental protection or other public health programs, or with authority over asbestos programs, in the State.

(c) Management plan review

(1) Review of plan

The Governor may disapprove a management plan within 90 days after the date of receipt of the plan if the plan—

(A) does not conform with the regulations under section 2643(i) of this title (or with section 2644(d) of this title if there are no regulations),

(B) does not assure that contractors who are accredited pursuant to this subchapter will be used to carry out the plan, or

(C) does not contain a response action schedule which is reasonable and timely, taking into account circumstances relevant to the speed at which the friable asbestos-containing material in the school buildings under the local educational agency's authority should be responded to, including human exposure to the asbestos while the friable asbestos-containing material remains in the school building, and the ability of the local educational agency to continue to provide educational services to the community.

(2) Revision of plan

If the State Governor disapproves a plan, the State Governor shall explain in writing to the local educational agency the reasons why the plan was disapproved and the changes that need to be made in the plan. Within 30 days after the date on which notice is received of disapproval of its plan, the local educational agency shall revise the plan to conform with the State Governor's suggested changes. The Governor may extend the 30-day period for not more than 90 days.

(d) Deferral of submission

(1) Request for deferral

A local educational agency may request a deferral, to May 9, 1989, of the deadline under subsection (a) of this section. Upon approval of such a request, the deadline under subsection (a) of this section is deferred until May 9, 1989, for the local educational agency which submitted the request. Such a request may cover one or more schools under the authority of the agency and shall include a list of all the schools covered by the request. A local educational agency shall file any such request with the State Governor by October 12, 1988, and shall include with the request either of the following statements:

(A) A statement—

(i) that the State in which the agency is located has requested from the Administrator, before June 1, 1988, a waiver under section 2643(m) of this title; and

(ii) that gives assurance that the local educational agency has carried out the notification and, in the case of a public school, public meeting required by paragraph (2).

(B) A statement, the accuracy of which is sworn to by a responsible official of the agency (by notarization or other means of certification), that includes the following with respect to each school for which a deferral is sought in the request:

(i) A statement that, in spite of the fact that the local educational agency has made a good faith effort to meet the deadline for submission of a management plan under subsection (a) of this section, the agency will not be able to meet the deadline. The statement shall include a brief explanation of the reasons why the deadline cannot be met.

(ii) A statement giving assurance that the local educational agency has made available for inspection by the public, at each school for which a deferral is sought

in the request, at least one of the following documents:

(I) A solicitation by the local educational agency to contract with an accredited asbestos contractor for inspection or management plan development.

(II) A letter attesting to the enrollment of school district personnel in an Environmental Protection Agency-accredited training course for inspection and management plan development.

(III) Documentation showing that an analysis of suspected asbestos-containing material from the school is pending at an accredited laboratory.

(IV) Documentation showing that an inspection or management plan has been completed in at least one other school under the local educational agency's authority.

(iii) A statement giving assurance that the local educational agency has carried out the notification and, in the case of a public school, public meeting required by paragraph (2).

(iv) A proposed schedule outlining all significant activities leading up to submission of a management plan by May 9, 1989, including inspection of the school (if not completed at the time of the request) with a deadline of no later than December 22, 1988, for entering into a signed contract with an accredited asbestos contractor for inspection (unless such inspections are to be performed by school personnel), laboratory analysis of material from the school suspected of containing asbestos, and development of the management plan.

(2) Notification and public meeting

Before filing a deferral request under paragraph (1), a local educational agency shall notify affected parent, teacher, and employee organizations of its intent to file such a request. In the case of a deferral request for a public school, the local educational agency shall discuss the request at a public meeting of the school board with jurisdiction over the school, and affected parent, teacher, and employee organizations shall be notified in advance of the time and place of such meeting.

(3) Response by Governor

(A) Not later than 30 days after the date on which a Governor receives a deferral request under paragraph (1) from a local educational agency, the Governor shall respond to the local educational agency in writing by acknowledging whether the request is complete or incomplete. If the request is incomplete, the Governor shall identify in the response the items that are missing from the request.

(B) A local educational agency may correct any deficiencies in an incomplete deferral request and refile the request with the Governor. In any case in which the local educational agency decides to refile the request, the agency shall refile the request, and the Governor shall respond to such refiled request in the manner described in subparagraph (A), no later than 15 days after the local educational agency has received a response from the Governor under subparagraph (A).

(C) Approval of a deferral request under this subsection occurs only upon the receipt by a local educational agency of a written acknowledgment from the Governor that the agency's deferral request is complete.

(4) Submission and review of plan

A local educational agency whose deferral request is approved shall submit a management plan to the Governor not later than May 9, 1989. Such management plan shall include a copy of the deferral request and the statement accompanying such request. Such management plan shall be reviewed in accordance with subsection (c) of this section, except that the Governor may extend the 30-day period for revision of the plan under subsection (c)(2) of this section for only an additional 30 days (for a total of 60 days).

(5) Implementation of plan

The approval of a deferral request from a local educational agency shall not be considered to be a waiver or exemption from the requirement under section 2643(i) of this title for the local educational agency to begin implementation of its management plan by July 9, 1989.

(6) EPA notice

(A) Not later than 15 days after July 18, 1988, the Administrator shall publish in the Federal Register the following:

(i) A notice describing the opportunity to file a request for deferral under this subsection.

(ii) A list of the State offices (including officials (if available) in each State as designated under subsection (b) of this section) with which deferral requests should be filed.

(B) As soon as practicable, but in no event later than 30 days, after July 18, 1988, the Administrator shall mail a notice describing the opportunity to file a request for deferral under this subsection to each local educational agency and to each State office in the list published under subparagraph (A).

(e) Status reports

(1) Not later than December 31, 1988, the Governor of each State shall submit to the Administrator a written statement on the status of management plan submissions and deferral requests by local educational agencies in the State. The statement shall be made available to local educational agencies in the State and shall contain the following:

(A) A list containing each local educational agency that submitted a management plan by October 12, 1988.

(B) A list containing each local educational agency whose deferral request was approved.

(C) A list containing each local educational agency that failed to submit a management plan by October 12, 1988, and whose deferral request was disapproved.

(D) A list containing each local educational agency that failed to submit a management plan by October 12, 1988, and did not submit a deferral request.

(2) Not later than December 31, 1989, the Governor of each State shall submit to the Administrator an updated version of the written statement submitted under paragraph (1). The statement shall be made available to local educational agencies in the State and shall contain the following:

(A) A list containing each local educational agency whose management plan was submitted and not disapproved as of October 9, 1989.

(B) A list containing each local educational agency whose management plan was submitted and disapproved, and which remains disapproved, as of October 9, 1989.

(C) A list containing each local educational agency that submitted a management plan after May 9, 1989, and before October 10, 1989.

(D) A list containing each local educational agency that failed to submit a management plan as of October 9, 1989.

(Pub. L. 94–469, title II, §205, as added Pub. L. 99–519, §2, Oct. 22, 1986, 100 Stat. 2979; amended Pub. L. 100–368, §§1(a), 2, July 18, 1988, 102 Stat. 829, 831.)

AMENDMENTS

1988—Subsec. (d). Pub. L. 100–368, §1(a), added subsec. (d).

Subsec. (e). Pub. L. 100–368, §2, added subsec. (e).

§ 2646. Contractor and laboratory accreditation

(a) Contractor accreditation

A person may not—

(1) inspect for asbestos-containing material in a school building under the authority of a local educational agency or in a public or commercial building,

(2) prepare a management plan for such a school, or

(3) design or conduct response actions, other than the type of action described in sections 2643(f) and 2644(c) of this title, with respect to friable asbestos-containing material in such a school or in a public or commercial building,

unless such person is accredited by a State under subsection (b) of this section or is accredited pursuant to an Administrator-approved course under subsection (c) of this section.

(b) Accreditation by State

(1) Model plan

(A) Persons to be accredited

Within 180 days after October 22, 1986, the Administrator, in consultation with affected organizations, shall develop a model contractor accreditation plan for States to give accreditation to persons in the following categories:

(i) Persons who inspect for asbestos-containing material in school buildings under the authority of a local educational agency or in public or commercial buildings.

(ii) Persons who prepare management plans for such schools.

(iii) Persons who design or carry out response actions, other than the type of action described in sections 2643(f) and 2644(c) of this title, with respect to friable asbestos-containing material in such schools or in public or commercial buildings.

(B) Plan requirements

The plan shall include a requirement that any person in a category listed in paragraph (1) achieve a passing grade on an examination and participate in continuing education to stay informed about current asbestos inspection and response action technology. The examination shall demonstrate the knowledge of the person in areas that the Administrator prescribes as necessary and appropriate in each of the categories. Such examinations may include requirements for knowledge in the following areas:

(i) Recognition of asbestos-containing material and its physical characteristics.

(ii) Health hazards of asbestos and the relationship between asbestos exposure and disease.

(iii) Assessing the risk of asbestos exposure through a knowledge of percentage weight of asbestos-containing material, friability, age, deterioration, location and accessibility of materials, and advantages and disadvantages of dry and wet response action methods.

(iv) Respirators and their use, care, selection, degree of protection afforded, fitting, testing, and maintenance and cleaning procedures.

(v) Appropriate work practices and control methods, including the use of high efficiency particle absolute vacuums, the use of amended water, and principles of negative air pressure equipment use and procedures.

(vi) Preparing a work area for response action work, including isolating work areas to prevent bystander or public exposure to asbestos, decontamination procedures, and procedures for dismantling work areas after completion of work.

(vii) Establishing emergency procedures to respond to sudden releases.

(viii) Air monitoring requirements and procedures.

(ix) Medical surveillance program requirements.

(x) Proper asbestos waste transportation and disposal procedures.

(xi) Housekeeping and personal hygiene practices, including the necessity of showers, and procedures to prevent asbestos exposure to an employee's family.

(2) State adoption of plan

Each State shall adopt a contractor accreditation plan at least as stringent as the model plan developed by the Administrator under paragraph (1), within 180 days after the commencement of the first regular session of the legislature of such State which is convened following the date on which the Administrator completes development of the model plan. In the case of a 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.), the Secretary of Defense shall adopt a contractor accreditation plan at least as stringent as that model.

(c) Accreditation by Administrator-approved course

(1) Course approval

Within 180 days after October 22, 1986, the Administrator shall ensure that any Environmental Protection Agency-approved asbestos training course is consistent with the model plan (including testing requirements) developed under subsection (b) of this section. A contractor may be accredited by taking and passing such a course.

(2) Treatment of persons with previous EPA asbestos training

A person who—

(A) completed an Environmental Protection Agency-approved asbestos training course before October 22, 1986, and

(B) passed (or passes) an asbestos test either before or after October 22, 1986,

may be accredited under paragraph (1) if the Administrator determines that the course and test are equivalent to the requirements of the model plan developed under subsection (b) of this section. If the Administrator so determines, the person shall be considered accredited for the purposes of this subchapter until a date that is one year after the date on which the State in which such person is employed establishes an accreditation program pursuant to subsection (b) of this section.

(3) Lists of courses

The Administrator, in consultation with affected organizations, shall publish (and revise as necessary)—

(A) a list of asbestos courses and tests in effect before October 22, 1986, which qualify for equivalency treatment under paragraph (2), and

(B) a list of asbestos courses and tests which the Administrator determines under paragraph (1) are consistent with the model plan and which will qualify a contractor for accreditation under such paragraph.

(d) Laboratory accreditation

(1) The Administrator shall provide for the development of an accreditation program for laboratories by the National Institute of Standards and Technology in accordance with paragraph (2). The Administrator shall transfer such funds as are necessary to the National Institute of Standards and Technology to carry out such program.

(2) The National Institute of Standards and Technology, upon request by the Administrator, shall, in consultation with affected organizations—

(A) within 360 days after October 22, 1986, develop an accreditation program for laboratories which conduct qualitative and semi-quantitative analyses of bulk samples of asbestos-containing material, and

(B) within 720 days after October 22, 1986, develop an accreditation program for laboratories which conduct analyses of air samples of asbestos from school buildings under the authority of a local educational agency.

(3) A laboratory which plans to carry out any such analysis shall comply with the requirements of the accreditation program.

(e) Financial assistance contingent on use of accredited persons

(1) A school which is an applicant for financial assistance under section 505 of the Asbestos School Hazard Abatement Act of 1984 [20 U.S.C. 4014] is not eligible for such assistance unless the school, in carrying out the requirements of this subchapter—

(A) uses a person (or persons)—

(i) who is accredited by a State which has adopted an accreditation plan based on the model plan developed under subsection (b) of this section, or

(ii) who is accredited pursuant to an Administrator-approved course under subsection (c) of this section, and

(B) uses a laboratory (or laboratories) which is accredited under the program developed under subsection (d) of this section.

(2) This subsection shall apply to any financial assistance provided under the Asbestos School Hazard Abatement Act of 1984 [20 U.S.C. 4011 et seq.] for activities performed after the following dates:

(A) In the case of activities performed by persons, after the date which is one year after October 22, 1986.

(B) In the case of activities performed by laboratories, after the date which is 180 days after the date on which a laboratory accreditation program is completed under subsection (d) of this section.

(f) List of EPA-approved courses

Not later than August 31, 1988, and every three months thereafter until August 31, 1991, the Administrator shall publish in the Federal Register a list of all Environmental Protection Agency-approved asbestos training courses for persons to achieve accreditation in each category described in subsection (b)(1)(A) of this section and for laboratories to achieve accreditation. The Administrator may continue publishing such a list after August 31, 1991, at such times as the Administrator considers it useful. The list shall include the name and address of each approved trainer and, to the extent available, a list of all the geographic sites where training courses will take place. The Administrator shall provide a copy of the list to each State official on the list published by the Administrator under section 2645(d)(6) of this title and to each regional office of the Environmental Protection Agency.

(Pub. L. 94–469, title II, § 206, as added Pub. L. 99–519, § 2, Oct. 22, 1986, 100 Stat. 2980; amended Pub. L. 100–368, § 3, July 18, 1988, 102 Stat. 832; Pub. L. 100–418, title V, § 5115(c), Aug. 23, 1988, 102 Stat. 1433; Pub. L. 101–637, § 15(a)(1), (2), Nov. 28, 1990, 104 Stat. 4596.)

REFERENCES IN TEXT

The Defense Dependents' Education Act of 1978, referred to in subsec. (b)(2), is title XIV of Pub. L. 95–561, Nov. 1, 1978, 92 Stat. 2365, as amended, which is classified principally to chapter 25A (§ 921 et seq.) of Title 20, Education. For complete classification of this Act to the Code, see Short Title note set out under section 921 of Title 20 and Tables.

The Asbestos School Hazard Abatement Act of 1984, referred to in subsec. (e)(2), is title V of Pub. L. 98–377,

Aug. 11, 1984, 98 Stat. 1287, as amended, which is classified generally to subchapter V (§ 4011 et seq.) of chapter 52 of Title 20. For complete classification of this Act to the Code, see Short Title note set out under section 4011 of Title 20 and Tables.

AMENDMENTS

1990—Subsec. (a)(1), (3). Pub. L. 101–637, § 15(a)(1), inserted before comma at end ''or in a public or commercial building''.

Subsec. (b)(1)(A)(i), (iii). Pub. L. 101–637, § 15(a)(2), inserted before period at end ''or in public or commercial buildings''.

1988—Subsec. (d)(1), (2). Pub. L. 100–418 substituted ''National Institute of Standards and Technology'' for ''National Bureau of Standards'' wherever appearing.

Subsec. (f). Pub. L. 100–368 added subsec. (f).

EFFECTIVE DATE OF 1990 AMENDMENT

Section 15(c) of Pub. L. 101–637 provided that: ''This section [amending this section and section 2647 of this title and enacting provisions set out as notes under this section] shall take effect upon the expiration of the 12-month period following the date of the enactment of this Act [Nov. 28, 1990]. The Administrator may extend the effective date for a period not to exceed one year if the Administrator determines that accredited asbestos contractors are needed to perform school-site abatement required under the Asbestos Hazard Emergency Response Act [of 1986] (15 U.S.C. 2641) and such an extension is necessary to ensure effective implementation of section 203 of the Toxic Substances Control Act [15 U.S.C. 2643].''

REVISION OF MODEL CONTRACTOR ACCREDITATION PROGRAM

Section 15(a)(3) of Pub. L. 101–637 provided that: ''Not later than one year after the date of the enactment of this Act [Nov. 28, 1990], the Administrator of the Environmental Protection Agency shall revise the model contractor accreditation plan promulgated under section 206(b)(1) of the Toxic Substances Control Act (15 U.S.C. 2646(b)(1)) to increase the minimum number of hours of training, including additional hours of hands-on health and safety training, required for asbestos abatement workers and to make such other changes as may be necessary to implement the amendments made by paragraphs (1) and (2) [amending this section].''

EPA ADMINISTRATOR NOT EXERCISING ''STATUTORY AUTHORITY'' UNDER OSHA LAW IN EXERCISING AUTHORITY UNDER THIS CHAPTER

Section 15(b) of Pub. L. 101–637 provided that: ''In exercising any authority under the Toxic Substances Control Act [15 U.S.C. 2601 et seq.] in connection with the amendment made by subsection (a) of this section [amending this section and section 2647 of this title], the Administrator of the Environmental Protection Agency shall not, for purposes of section 4(b)(1) of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653(b)(1)), be considered to be exercising statutory authority to prescribe or enforce standards or regulations affecting occupational safety and health.''

§ 2647. Enforcement

(a) Penalties

Any local educational agency—

(1) which fails to conduct an inspection pursuant to regulations under section 2643(b) of this title or under section 2644(b) of this title,

(2) which knowingly submits false information to the Governor regarding any inspection pursuant to regulations under section 2643(i) of this title or knowingly includes false information in any inspection statement under section 2644(d)(3) of this title,

(3) which fails to develop a management plan pursuant to regulations under section 2643(i) of this title or under section 2644(d) of this title,

(4) which carries out any activity prohibited by section 2655 of this title, or

(5) which knowingly submits false information to the Governor regarding a deferral request under section 2645(d) of this title.[1]

is liable for a civil penalty of not more than $5,000 for each day during which the violation continues. Any civil penalty under this subsection shall be assessed and collected in the same manner, and subject to the same provisions, as in the case of civil penalties assessed and collected under section 2615 of this title. For purposes of this subsection, a ''violation'' means a failure to comply with respect to a single school building. The court shall order that any civil penalty collected under this subsection be used by the local educational agency for purposes of complying with this subchapter. Any portion of a civil penalty remaining unspent after compliance by a local educational agency is completed shall be deposited into the Asbestos Trust Fund established by section 4022 of title 20.

(b) Relationship to subchapter I of this chapter

A local educational agency is not liable for any civil penalty under subchapter I of this chapter for failing or refusing to comply with any rule promulgated or order issued under this subchapter.

(c) Enforcement considerations

(1) In determining the amount of a civil penalty to be assessed under subsection (a) of this section against a local educational agency, the Administrator shall consider—

(A) the significance of the violation;

(B) the culpability of the violator, including any history of previous violations under this chapter;

(C) the ability of the violator to pay the penalty; and

(D) the ability of the violator to continue to provide educational services to the community.

(2) Any action ordered by a court in fashioning relief under section 2619 of this title shall be consistent with regulations promulgated under section 2643 of this title (or with the requirements of section 2644 of this title if there are no regulations).

(d) Citizen complaints

Any person may file a complaint with the Administrator or with the Governor of the State in which the school building is located with respect to asbestos-containing material in a school building. If the Administrator or Governor receives a complaint under this subsection containing allegations which provide a reasonable basis to believe that a violation of this chapter has occurred, the Administrator or Governor shall investigate and respond (including taking enforcement action where appropriate) to the complaint within a reasonable period of time.

---

[1] So in original. The period probably should be a comma.

(e) Citizen petitions

(1) Any person may petition the Administrator to initiate a proceeding for the issuance, amendment, or repeal of a regulation or order under this subchapter.

(2) Such petition shall be filed in the principal office of the Administrator and shall set forth the facts which it is claimed establish that it is necessary to issue, amend, or repeal a regulation or order under this subchapter.

(3) The Administrator may hold a public hearing or may conduct such investigation or proceeding as the Administrator deems appropriate in order to determine whether or not such petition should be granted.

(4) Within 90 days after filing of a petition described in paragraph (1), the Administrator shall either grant or deny the petition. If the Administrator grants such petition, the Administrator shall promptly commence an appropriate proceeding in accordance with this subchapter. If the Administrator denies such petition, the Administrator shall publish in the Federal Register the Administrator's reasons for such denial. The granting or denial of a petition under this subsection shall not affect any deadline or other requirement of this subchapter.

(f) Citizen civil actions with respect to EPA regulations

(1) Any person may commence a civil action without prior notice against the Administrator to compel the Administrator to meet the deadlines in section 2643 of this title for issuing advanced notices of proposed rulemaking, proposing regulations, and promulgating regulations. Any such action shall be brought in the district court of the United States for the District of Columbia.

(2) In any action brought under paragraph (1) in which the court finds the Administrator to be in violation of any deadline in section 2643 of this title, the court shall set forth a schedule for promulgating the regulations required by section 2643 of this title and shall order the Administrator to comply with such schedule. The court may extend any deadline (which has not already occurred) in section 2644(b), (c), or (d) of this title for a period of not more than 6 months, if the court-ordered schedule will result in final promulgation of the pertinent regulations within the extended period. Such deadline extensions may not be granted by the court beginning 720 days after October 22, 1986.

(3) Section 2619 of this title shall apply to civil actions described in this subsection, except to the extent inconsistent with this subsection.

(g) Failure to attain accreditation; penalty

Any contractor who—

(1) inspects for asbestos-containing material in a school, public or commercial building;

(2) designs or conducts response actions with respect to friable asbestos-containing material in a school, public or commercial building; or

(3) employs individuals to conduct response actions with respect to friable asbestos-containing material in a school, public or commercial building;

and who fails to obtain the accreditation under section 2646 of this title, or in the case of employees to require or provide for the accreditation required, is liable for a civil penalty of not more than $5,000 for each day during which the violation continues, unless such contractor is a direct employee of the Federal Government.

(Pub. L. 94–469, title II, § 207, as added Pub. L. 99–519, § 2, Oct. 22, 1986, 100 Stat. 2983; amended Pub. L. 100–368, § 5, July 18, 1988, 102 Stat. 833; Pub. L. 101–637, § 15(a)(4), Nov. 28, 1990, 104 Stat. 4596.)

AMENDMENTS

1990—Subsec. (g). Pub. L. 101–637 added subsec. (g).

1988—Subsec. (a)(4), (5). Pub. L. 100–368 added pars. (4) and (5).

EFFECTIVE DATE OF 1990 AMENDMENT

Amendment by Pub. L. 101–637 effective upon expiration of 12-month period following Nov. 28, 1990, with provisions for extension, see section 15(c) of Pub. L. 101–637, set out as a note under section 2646 of this title.

EPA ADMINISTRATOR NOT EXERCISING ''STATUTORY AUTHORITY'' UNDER OSHA LAW IN EXERCISING AUTHORITY UNDER THIS CHAPTER

In exercising any authority under this chapter in connection with amendment made by Pub. L. 101–637, Administrator of Environmental Protection Agency not, for purposes of section 653(b)(1) of Title 29, Labor, to be considered to be exercising statutory authority to prescribe or enforce standards or regulations affecting occupational safety and health, see section 15(b) of Pub. L. 101–637, set out as a note under section 2646 of this title.

§ 2648. Emergency authority

(a) Emergency action

(1) Authority

Whenever—

(A) the presence of airborne asbestos or the condition of friable asbestos-containing material in a school building governed by a local educational agency poses an imminent and substantial endangerment to human health or the environment, and

(B) the local educational agency is not taking sufficient action (as determined by the Administrator or the Governor) to respond to the airborne asbestos or friable asbestos-containing material,

the Administrator or the Governor of a State is authorized to act to protect human health or the environment.

(2) Limitations on Governor's action

The Governor of a State shall notify the Administrator within a reasonable period of time before the Governor plans to take an emergency action under this subsection. After such notification, if the Administrator takes an emergency action with respect to the same hazard, the Governor may not carry out (or continue to carry out, if the action has been started) the emergency action.

(3) Notification

The following notification shall be provided before an emergency action is taken under this subsection:

(A) In the case of a Governor taking the action, the Governor shall notify the local educational agency concerned.

(B) In the case of the Administrator taking the action, the Administrator shall notify both the local educational agency concerned and the Governor of the State in which such agency is located.

(4) Cost recovery

The Administrator or the Governor of a State may seek reimbursement for all costs of an emergency action taken under this subsection in the United States District Court for the District of Columbia or for the district in which the emergency action occurred. In any action seeking reimbursement from a local educational agency, the action shall be brought in the United States District Court for the district in which the local educational agency is located.

(b) Injunctive relief

Upon receipt of evidence that the presence of airborne asbestos or the condition of friable asbestos-containing material in a school building governed by a local educational agency poses an imminent and substantial endangerment to human health or the environment—

(1) the Administrator may request the Attorney General to bring suit, or

(2) the Governor of a State may bring suit,

to secure such relief as may be necessary to respond to the hazard. The district court of the United States in the district in which the response will be carried out shall have jurisdiction to grant such relief, including injunctive relief.

(Pub. L. 94–469, title II, §208, as added Pub. L. 99–519, §2, Oct. 22, 1986, 100 Stat. 2985.)

§ 2649. State and Federal law

(a) No preemption

Nothing in this subchapter shall be construed, interpreted, or applied to preempt, displace, or supplant any other State or Federal law, whether statutory or common.

(b) Cost and damage awards

Nothing in this subchapter or any standard, regulation, or requirement promulgated pursuant to this subchapter shall be construed or interpreted to preclude any court from awarding costs and damages associated with the abatement, including the removal, of asbestos-containing material, or a portion of such costs, at any time prior to the actual date on which such material is removed.

(c) State may establish more requirements

Nothing in this subchapter shall be construed or interpreted as preempting a State from establishing any additional liability or more stringent requirements with respect to asbestos in school buildings within such State.

(d) No Federal cause of action

Nothing in this subchapter creates a cause of action or in any other way increases or diminishes the liability of any person under any other law.

(e) Intent of Congress

It is not the intent of Congress that this subchapter or rules, regulations, or orders issued pursuant to this subchapter be interpreted as influencing, in either the plaintiff's or defendant's favor, the disposition of any civil action for damages relating to asbestos. This subsection does not affect the authority of any court to make a determination in an adjudicatory proceeding under applicable State law with respect to the admission into evidence or any other use of this subchapter or rules, regulations, or orders issued pursuant to this subchapter.

(Pub. L. 94–469, title II, §209, as added Pub. L. 99–519, §2, Oct. 22, 1986, 100 Stat. 2986.)

§ 2650. Asbestos contractors and local educational agencies

(a) Study

(1) General requirement

The Administrator shall conduct a study on the availability of liability insurance and other forms of assurance against financial loss which are available to local educational agencies and asbestos contractors with respect to actions required under this subchapter. Such study shall examine the following:

(A) The extent to which liability insurance and other forms of assurance against financial loss are available to local educational agencies and asbestos contractors.

(B) The extent to which the cost of insurance or other forms of assurance against financial loss has increased and the extent to which coverage has become less complete.

(C) The extent to which any limitation in the availability of insurance or other forms of assurance against financial loss is the result of factors other than standards of liability in applicable law.

(D) The extent to which the existence of the regulations required by subsections (c) and (d) of section 2643 of this title and the accreditation of contractors under section 2646 of this title has affected the availability or cost of insurance or other forms of assurance against financial loss.

(E) The extent to which any limitation on the availability of insurance or other forms of assurance against financial loss is inhibiting inspections for asbestos-containing material or the development or implementation of management plans under this subchapter.

(F) Identification of any other impediments to the timely completion of inspections or the development and implementation of management plans under this subchapter.

(2) Interim report

Not later than April 1, 1988, the Administrator shall submit to the Congress an interim report on the progress of the study required by this subsection, along with preliminary findings based on information collected to that date.

(3) Final report

Not later than October 1, 1990, the Administrator shall submit to the Congress a final report on the study required by this subsection, including final findings based on the information collected.

(b) State action

On the basis of the interim report or the final report of the study required by subsection (a) of this section, a State may enact or amend State law to establish or modify a standard of liability for local educational agencies or asbestos contractors with respect to actions required under this subchapter.

(Pub. L. 94–469, title II, § 210, as added Pub. L. 99–519, § 2, Oct. 22, 1986, 100 Stat. 2986.)

§ 2651. Public protection

(a) Public protection

No State or local educational agency may discriminate against a person in any way, including firing a person who is an employee, because the person provided information relating to a potential violation of this subchapter to any other person, including a State or the Federal Government.

(b) Labor Department review

Any public or private employee or representative of employees who believes he or she has been fired or otherwise discriminated against in violation of subsection (a) of this section may within 90 days after the alleged violation occurs apply to the Secretary of Labor for a review of the firing or alleged discrimination. The review shall be conducted in accordance with section 660(c) of title 29.

(Pub. L. 94–469, title II, § 211, as added Pub. L. 99–519, § 2, Oct. 22, 1986, 100 Stat. 2987.)

§ 2652. Asbestos Ombudsman

(a) Appointment

The Administrator shall appoint an Asbestos Ombudsman, who shall carry out the duties described in subsection (b) of this section.

(b) Duties

The duties of the Asbestos Ombudsman are—

(1) to receive complaints, grievances, and requests for information submitted by any person with respect to any aspect of this subchapter,

(2) to render assistance with respect to the complaints, grievances, and requests received, and

(3) to make such recommendations to the Administrator as the Ombudsman considers appropriate.

(Pub. L. 94–469, title II, § 212, as added Pub. L. 99–519, § 2, Oct. 22, 1986, 100 Stat. 2987.)

§ 2653. EPA study of asbestos-containing material in public buildings

Within 360 days after October 22, 1986, the Administrator shall conduct and submit to the Congress the results of a study which shall—

(1) assess the extent to which asbestos-containing materials are present in public and commercial buildings;

(2) assess the condition of asbestos-containing material in commercial buildings and the likelihood that persons occupying such buildings, including service and maintenance personnel, are, or may be, exposed to asbestos fibers;

(3) consider and report on whether public and commercial buildings should be subject to the same inspection and response action requirements that apply to school buildings;

(4) assess whether existing Federal regulations adequately protect the general public, particularly abatement personnel, from exposure to asbestos during renovation and demolition of such buildings; and

(5) include recommendations that explicitly address whether there is a need to establish standards for, and regulate asbestos exposure in, public and commercial buildings.

(Pub. L. 94–469, title II, § 213, as added Pub. L. 99–519, § 2, Oct. 22, 1986, 100 Stat. 2987.)

§ 2654. Transitional rules

Any regulation of the Environmental Protection Agency under subchapter I of this chapter which is inconsistent with this subchapter shall not be in effect after October 22, 1986. Any advanced notice of proposed rulemaking, any proposed rule, and any regulation of the Environmental Protection Agency in effect before October 22, 1986, which is consistent with the regulations required under section 2643 of this title shall remain in effect and may be used to meet the requirements of section 2643 of this title, except that any such regulation shall be enforced under this chapter.

(Pub. L. 94–469, title II, § 214, as added Pub. L. 99–519, § 2, Oct. 22, 1986, 100 Stat. 2988.)

§ 2655. Worker protection

(a) Prohibition on certain activities

Until the local educational agency with authority over a school has submitted a management plan (for the school) which the State Governor has not disapproved as of the end of the period for review and revision of the plan under section 2645 of this title, the local educational agency may not do either of the following in the school:

(1) Perform, or direct an employee to perform, renovations or removal of building materials, except emergency repairs, in the school, unless—

(A) the school is carrying out work under a grant awarded under section 4014 of title 20; or

(B) an inspection that complies with the requirements of regulations promulgated under section 2643 of this title has been carried out in the school and the agency complies with the following sections of title 40 of the Code of Federal Regulations:

(i) Paragraphs (g), (h), and (i) of section 763.90 (response actions).

(ii) Appendix D to subpart E of part 763 (transport and disposal of asbestos waste).

(2) Perform, or direct an employee to perform, operations and maintenance activities in the school, unless the agency complies with the following sections of title 40 of the Code of Federal Regulations:

(A) Section 763.91 (operations and maintenance), including appendix B to subpart E of part 763.

(B) Paragraph (a)(2) of section 763.92 (training and periodic surveillance).

(b) Employee training and equipment

Any school employee who is directed to conduct emergency repairs involving any building material containing asbestos or suspected of containing asbestos, or to conduct operations and maintenance activities, in a school—

(1) shall be provided the proper training to safely conduct such work in order to prevent potential exposure to asbestos; and

(2) shall be provided the proper equipment and allowed to follow work practices that are necessary to safely conduct such work in order to prevent potential exposure to asbestos.

(c) "Emergency repair" defined

For purposes of this section, the term ''emergency repair'' means a repair in a school building that was not planned and was in response to a sudden, unexpected event that threatens either—

(1) the health or safety of building occupants; or

(2) the structural integrity of the building.

(Pub. L. 94–469, title II, §215, as added Pub. L. 100–368, §4(a), July 18, 1988, 102 Stat. 832.)

EFFECTIVE DATE

Section 4(c) of Pub. L. 100–368 provided that: ''Section 215 of the Toxic Substances Control Act [this section], as added by subsection (a), shall take effect on October 12, 1988.''

§ 2656. Training grants

(a) Grants

The Administrator is authorized to award grants under this section to nonprofit organizations that demonstrate experience in implementing and operating health and safety asbestos training and education programs for workers who are or will be engaged in asbestos-related activities (including State and local governments, colleges and universities, joint labor-management trust funds, and nonprofit government employee organizations) to establish and, or, operate asbestos training programs on a not-for-profit basis. Applications for grants under this subsection shall be submitted in such form and manner, and contain such information, as the Administrator prescribes.

(b) Authorization

Of such sums as are authorized to be appropriated pursuant to section 4021(a) of title 20 for the fiscal years 1991, 1992, 1993, 1994, and 1995, not more than $5,000,000 are authorized to be appropriated to carry out this section in each such fiscal year.

(Pub. L. 94–469, title II, §216, as added Pub. L. 101–637, §16(a)(1), Nov. 28, 1990, 104 Stat. 4597.)

EFFECTIVE DATE

Section 16(b) of Pub. L. 101–637 provided that: ''Section 216 of the Toxic Substances Control Act [this section], as added by subsection (a), shall take effect on the date of the enactment of this Act [Nov. 28, 1990].''

SUBCHAPTER III—INDOOR RADON ABATEMENT

§ 2661. National goal

The national long-term goal of the United States with respect to radon levels in buildings is that the air within buildings in the United States should be as free of radon as the ambient air outside of buildings.

(Pub. L. 94–469, title III, §301, as added Pub. L. 100–551, §1(a), Oct. 28, 1988, 102 Stat. 2755.)

REPORT ON RECOMMENDED POLICY FOR DEALING WITH RADON IN ASSISTED HOUSING

Pub. L. 100–628, title X, §1091, Nov. 7, 1988, 102 Stat. 3283, provided that:

''(a) PURPOSES.—The purposes of this section are—

''(1) to require the Department of Housing and Urban Development to develop an effective departmental policy for dealing with radon contamination that utilizes any Environmental Protection Agency guidelines and standards to ensure that occupants of housing covered by this section are not exposed to hazardous levels of radon; and

''(2) to require the Department of Housing and Urban Development to assist the Environmental Protection Agency in reducing radon contamination.

''(b) PROGRAM.—

''(1) APPLICABILITY.—The housing covered by this section is—

''(A) multifamily housing owned by the Department of Housing and Urban Development;

''(B) public housing and Indian housing assisted under the United States Housing Act of 1937 [42 U.S.C. 1437 et seq.];

''(C) housing receiving project-based assistance under section 8 of the United States Housing Act of 1937 [42 U.S.C. 1437f];

''(D) housing assisted under section 236 of the National Housing Act [12 U.S.C. 1715z–1]; and

''(E) housing assisted under section 221(d)(3) of the National Housing Act [12 U.S.C. 1715*l*(d)(3)].

''(2) IN GENERAL.—The Secretary of Housing and Urban Development shall develop and recommend to the Congress a policy for dealing with radon contamination that specifies programs for education, research, testing, and mitigation of radon hazards in housing covered by this section.

''(3) STANDARDS.—In developing the policy, the Secretary shall utilize any guidelines, information, or standards established by the Environmental Protection Agency for—

''(A) testing residential and nonresidential structures for radon;

''(B) identifying elevated radon levels;

''(C) identifying when remedial actions should be taken; and

''(D) identifying geographical areas that are likely to have elevated levels of radon.

''(4) COORDINATION.—In developing the policy, the Secretary shall coordinate the efforts of the Department of Housing and Urban Development with the Environmental Protection Agency, and other appropriate Federal agencies, and shall consult with State and local governments, the housing industry, consumer groups, health organizations, appropriate professional organizations, and other appropriate experts.

''(5) REPORT.—The Secretary shall submit a report to the Congress within 1 year after the date of the enactment of this Act [Nov. 7, 1988] that describes the Secretary's recommended policy for dealing with radon contamination and the Secretary's reasons for recommending such policy. The report shall include an estimate of the housing covered by this section that is likely to have hazardous levels of radon.

''(c) COOPERATION WITH ENVIRONMENTAL PROTECTION AGENCY.—Within 6 months after the date of the enactment of this Act [Nov. 7, 1988], the Secretary and the Administrator of the Environmental Protection Agency shall enter into a memorandum of understanding describing the Secretary's plan to assist the Administrator in carrying out the Environmental Protection Agency's authority to assess the extent of radon con-

Asbestos Hazard Emergency Response Act (AHERA)

40 CFR Part 763: 52FR October 30, 1987

Rules Summary and Locating Guide

Scope & Purpose	763.80
Definitions	763.83
General LEA Responsibilities	763.84
"Designee"	763.84(g)(1)
"Designee" - Training	763.84(g)(2)
Inspection and Reinspection	763.85
Accredited Inspector	763.85(a)(3)
Reinspection	763.85(b)
Bulk Sampling	763.86
Bulk Sample Analysis	763.87
Assessment	763.88
Response Action	763.90
Operations and Maintenance	763.91
Worker Protection	763.91(b)
Cleaning	763.91(c)
O&M Activities	763.91(d)
Fiber Release Episode	763.91(f)
Training (Maintenance & Custodial)	763.92(a)
Periodic Surveillance	763.92(b)
Management Plans	763.93
Submittal Date	763.93(a)
Implementation Date	763.93(c)
Accredited Management Planner	763.93(e)
Content of Management Plan	763.93(e)
Availability of the Management Plan for Review, Public Notification	763.93(g)
Record Keeping	763.94
Warning Labels	763.94
Compliance and Enforcement	763.97
Exclusions	763.99

Appendices	**Titles**
Appendix A	Interim Transmission Electron Microscopy Analytical Methods
Appendix B	Work Practices and Engineering Controls For Small-Scale, Short Duration Operations Maintenance and Repair Activities involving ACM
Appendix C	Model Accreditation Plan 52FR, April 30, 1987
Appendix D	Transport and Disposal of Asbestos Waste
Appendix E	Interim Method of the Determination of Asbestos in Bulk Insulation Samples

Guidance and interpretation of the rules is available in the preamble to the final rule in 52 FR pages 41826 and 41845

P.L. 99-159, Title II of the Toxic Substance Control Act is the Asbestos Hazard Emergency Response Act signed into law on October 22, 1986. The act requires EPA to issue the AHERA Rules and Model Accreditation Plan.

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

§ 761.395 A validation study.

(a) Decontaminate the following prepared sample surfaces using the selected testing parameters and experimental conditions. Take a standard wipe sample of the decontaminated surface.

(1) At least one uncontaminated surface. The surface levels of PCBs on the uncontaminated surface must be <1 μg/100 cm^2.

(2) At least seven contaminated surfaces.

(b)(1) Use SW-846, Test Methods for Evaluating Solid Waste methods for sample extraction and chemical analysis as follows: Use Method 3500B/3540C or Method 3500B/3550B for the extraction and cleanup of the extract and Method 8082 for the chemical analysis, or methods validated under subpart Q of this part.

(2) Report all validation study surface sample concentrations on the basis of micrograms of PCBs per 100 cm^2 of surface sampled.

(c) Following completion of the validation study, measurements from the contaminated surfaces must have an arithmetic mean of ≤10 μg/100 cm^2. If the arithmetic mean is >10 μg/100 cm^2, then the validation study failed and the solvent may not be used for decontamination under §761.79(d)(4) according to the parameters tested.

§ 761.398 Reporting and recordkeeping.

(a) Submit validation study results to the Director, Office of Resource Conservation and Recovery (5301P), Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460–0001, prior to the first use of a new solvent for alternate decontamination under §761.79(d)(4). The use of a new solvent is not TSCA Confidential Business Information (CBI). From time to time, EPA will confirm the use of validated new decontamination solvents and publish the new solvents and validated decontamination procedures in the FEDERAL REGISTER.

(b) Any person may begin to use solvent validated in accordance with this subpart at the time results are submitted to EPA.

(c) Record all testing parameters and experimental conditions from the successful validation study into a standard operating procedure (SOP) for reference whenever the decontamination procedure is used. Include in the SOP the identity of the soaking solvent, the length of time of the soak, and the ratio of the soak solvent to contaminated surface area during the soaking process. Also include in the SOP the maximum concentration of PCBs in the spilled material and the identity of the spilled material, and/or the measured maximum surface concentration of the contaminated surface used in the validation study. Record and keep the results of the validation study as an appendix to the SOP. Include in this appendix, the solvent used to make the spiking solution, the PCB concentration of the spiking solution used to contaminate the surfaces in the validation study, and all of the validation study testing parameters and experimental conditions.

[63 FR 35473, June 29, 1998, as amended at 72 FR 57241, Oct. 9, 2007; 74 FR 30235, June 25, 2009]

PART 763—ASBESTOS

Subparts A–D [Reserved]

Subpart E—Asbestos-Containing Materials in Schools

Sec.

763.80 Scope and purpose.
763.83 Definitions.
763.84 General local education agency responsibilities.
763.85 Inspection and reinspections.
763.86 Sampling.
763.87 Analysis.
763.88 Assessment.
763.90 Response actions.
763.91 Operations and maintenance.
763.92 Training and periodic surveillance.
763.93 Management plans.
763.94 Recordkeeping.
763.95 Warning labels.
763.97 Compliance and enforcement.
763.98 Waiver; delegation to State.
763.99 Exclusions.
APPENDIX A TO SUBPART E—INTERIM TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL METHODS—MANDATORY AND NONMANDATORY—AND MANDATORY SECTION TO DETERMINE COMPLETION OF RESPONSE ACTIONS
APPENDIX B TO SUBPART E [RESERVED]
APPENDIX C TO SUBPART E—ASBESTOS MODEL ACCREDITATION PLAN

APPENDIX D TO SUBPART E—TRANSPORT AND DISPOSAL OF ASBESTOS WASTE
APPENDIX E TO SUBPART E—INTERIM METHOD OF THE DETERMINATION OF ASBESTOS IN BULK INSULATION SAMPLES

Subpart F [Reserved]

Subpart G—Asbestos Worker Protection

763.120 What is the purpose of this subpart?
763.121 Does this subpart apply to me?
763.122 What does this subpart require me to do?
763.123 May a State implement its own asbestos worker protection plan?

Subpart H [Reserved]

Subpart I—Prohibition of the Manufacture, Importation, Processing, and Distribution in Commerce of Certain Asbestos-Containing Products; Labeling Requirements

763.160 Scope.
763.163 Definitions.
763.165 Manufacture and importation prohibitions.
763.167 Processing prohibitions.
763.169 Distribution in commerce prohibitions.
763.171 Labeling requirements.
763.173 Exemptions.
763.175 Enforcement.
763.176 Inspections.
763.178 Recordkeeping.
763.179 Confidential business information claims.

AUTHORITY: 15 U.S.C. 2605, 2607(c), 2643, and 2646.

Subparts A–D [Reserved]

Subpart E—Asbestos-Containing Materials in Schools

SOURCE: 52 FR 41846, Oct. 30, 1987, unless otherwise noted.

§ 763.80 Scope and purpose.

(a) This rule requires local education agencies to identify friable and nonfriable asbestos-containing material (ACM) in public and private elementary and secondary schools by visually inspecting school buildings for such materials, sampling such materials if they are not assumed to be ACM, and having samples analyzed by appropriate techniques referred to in this rule. The rule requires local education agencies to submit management plans to the Governor of their State by October 12, 1988, begin to implement the plans by July 9, 1989, and complete implementation of the plans in a timely fashion. In addition, local education agencies are required to use persons who have been accredited to conduct inspections, reinspections, develop management plans, or perform response actions. The rule also includes recordkeeping requirements. Local education agencies may contractually delegate their duties under this rule, but they remain responsible for the proper performance of those duties. Local education agencies are encouraged to consult with EPA Regional Asbestos Coordinators, or if applicable, a State's lead agency designated by the State Governor, for assistance in complying with this rule.

(b) Local education agencies must provide for the transportation and disposal of asbestos in accordance with EPA's ''Asbestos Waste Management Guidance.'' For convenience, applicable sections of this guidance are reprinted as Appendix D of this subpart. There are regulations in place, however, that affect transportation and disposal of asbestos waste generated by this rule. The transportation of asbestos waste is covered by the Department of Transportation (49 CFR part 173, subpart J) and disposal is covered by the National Emissions Standards for Hazardous Air Pollutants (NESHAP) (40 CFR part 61, subpart M).

§ 763.83 Definitions.

For purposes of this subpart:

Act means the Toxic Substances Control Act (TSCA), 15 U.S.C. 2601, *et seq*.

Accessible when referring to ACM means that the material is subject to disturbance by school building occupants or custodial or maintenance personnel in the course of their normal activities.

Accredited or *accreditation* when referring to a person or laboratory means that such person or laboratory is accredited in accordance with section 206 of Title II of the Act.

Air erosion means the passage of air over friable ACBM which may result in the release of asbestos fibers.

Asbestos means the asbestiform varieties of: Chrysotile (serpentine); crocidolite (riebeckite); amosite (cum-

mingtonitegrunerite); anthophyllite; tremolite; and actinolite.

Asbestos-containing material (ACM) when referring to school buildings means any material or product which contains more than 1 percent asbestos.

Asbestos-containing building material (ACBM) means surfacing ACM, thermal system insulation ACM, or miscellaneous ACM that is found in or on interior structural members or other parts of a school building.

Asbestos debris means pieces of ACBM that can be identified by color, texture, or composition, or means dust, if the dust is determined by an accredited inspector to be ACM.

Damaged friable miscellaneous ACM means friable miscellaneous ACM which has deteriorated or sustained physical injury such that the internal structure (cohesion) of the material is inadequate or, if applicable, which has delaminated such that its bond to the substrate (adhesion) is inadequate or which for any other reason lacks fiber cohesion or adhesion qualities. Such damage or deterioration may be illustrated by the separation of ACM into layers; separation of ACM from the substrate; flaking, blistering, or crumbling of the ACM 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 ACM means friable surfacing ACM which has deteriorated or sustained physical injury such that the internal structure (cohesion) of the material is inadequate or which has delaminated such that its bond to the substrate (adhesion) is inadequate, or which, for any other reason, lacks fiber cohesion or adhesion qualities. Such damage or deterioration may be illustrated by the separation of ACM into layers; separation of ACM from the substrate; flaking, blistering, or crumbling of the ACM 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 or significantly damaged thermal system insulation ACM means thermal system insulation ACM on pipes, boilers, tanks, ducts, and other thermal system insulation equipment where the insulation has lost its structural integrity, or its covering, in whole or in part, is crushed, waterstained, gouged, punctured, missing, or not intact such that it is not able to contain fibers. Damage may be further illustrated by occasional punctures, gouges or other signs of physical injury to ACM; occasional water damage on the protective coverings/jackets; or exposed ACM ends or joints. Asbestos debris originating from the ACBM in question may also indicate damage.

Encapsulation means the treatment of ACBM with a material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent the release of fibers, as the encapsulant creates a membrane over the surface (bridging encapsulant) or penetrates the material and binds its components together (penetrating encapsulant).

Enclosure means an airtight, impermeable, permanent barrier around ACBM to prevent the release of asbestos fibers into the air.

Fiber release episode means any uncontrolled or unintentional disturbance of ACBM resulting in visible emission.

Friable when referring to material in a school building means that the material, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure, and includes previously nonfriable material after such previously nonfriable material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

Functional space means 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.

High-efficiency particulate air (HEPA) refers to a filtering system capable of trapping and retaining at least 99.97

percent of all monodispersed particles 0.3 μm in diameter or larger.

Homogeneous area means an area of surfacing material, thermal system insulation material, or miscellaneous material that is uniform in color and texture.

Local education agency means:

(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 dependent's education system provided for under the Defense Dependents' Education Act of 1978 (20 U.S.C. 921, et seq.).

Miscellaneous ACM means miscellaneous material that is ACM in a school building.

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

Nonfriable means material in a school building which when dry may not be crumbled, pulverized, or reduced to powder by hand pressure.

Operations and maintenance program means 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.

Potential damage means 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 means 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 or, under certain circumstances, vibration or air erosion.

Preventive measures means actions taken to reduce disturbance of ACBM or otherwise eliminate the reasonable likelihood of the material's becoming damaged or significantly damaged.

Removal means the taking out or the stripping of substantially all ACBM from a damaged area, a functional space, or a homogeneous area in a school building.

Repair means returning damaged ACBM to an undamaged condition or to an intact state so as to prevent fiber release.

Response action means a method, including removal, encapsulation, enclosure, repair, operations and maintenance, that protects human health and the environment from friable ACBM.

Routine maintenance area means 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.

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

School building means:

(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.

Significantly damaged friable miscellaneous ACM means damaged friable miscellaneous ACM where the damage is extensive and severe.

Significantly damaged friable surfacing ACM means damaged friable surfacing ACM in a functional space where the damage is extensive and severe.

State means a State, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Northern Marianas, the Trust Territory of the Pacific Islands, and the Virgin Islands.

Surfacing ACM means surfacing material that is ACM.

Surfacing material means material in a school 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.

Thermal system insulation means material in a school 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.

Thermal system insulation ACM means thermal system insulation that is ACM.

Vibration means the periodic motion of friable ACBM which may result in the release of asbestos fibers.

§ 763.84 General local education agency responsibilities.

Each local education agency shall:

(a) Ensure that the activities of any persons who perform inspections, reinspections, and periodic surveillance, develop and update management plans, and develop and implement response actions, including operations and maintenance, are carried out in accordance with subpart E of this part.

(b) Ensure that all custodial and maintenance employees are properly trained as required by this subpart E and other applicable Federal and/or State regulations (e.g., the Occupational Safety and Health Administration asbestos standard for construction, the EPA worker protection rule, or applicable State regulations).

(c) Ensure that workers and building occupants, or their legal guardians, are informed at least once each school year about inspections, response actions, and post-response action activities, including periodic reinspection and surveillance activities that are planned or in progress.

(d) Ensure that short-term workers (e.g., telephone repair workers, utility workers, or exterminators) who may come in contact with asbestos in a school are provided information regarding the locations of ACBM and suspected ACBM assumed to be ACM.

(e) Ensure that warning labels are posted in accordance with § 763.95.

(f) Ensure that management plans are available for inspection and notification of such availability has been provided as specified in the management plan under § 763.93(g).

(g)(1) Designate a person to ensure that requirements under this section are properly implemented.

(2) Ensure that the designated person receives adequate training to perform duties assigned under this section. Such training shall provide, as necessary, basic knowledge of:

(i) Health effects of asbestos.

(ii) Detection, identification, and assessment of ACM.

(iii) Options for controlling ACBM.

(iv) Asbestos management programs.

(v) Relevant Federal and State regulations concerning asbestos, including those in this subpart E and those of the Occupational Safety and Health Administration, U.S. Department of Labor, the U.S. Department of Transportation and the U.S. Environmental Protection Agency.

(h) Consider whether any conflict of interest may arise from the interrelationship among accredited personnel and whether that should influence the selection of accredited personnel to perform activities under this subpart.

§ 763.85 Inspection and reinspections.

(a) *Inspection*. (1) Except as provided in paragraph (a)(2) of this section, before October 12, 1988, local education agencies shall inspect each school building that they lease, own, or otherwise use as a school building to identify all locations of friable and nonfriable ACBM.

(2) Any building leased or acquired on or after October 12, 1988, that is to be used as a school building shall be inspected as described under paragraphs (a) (3) and (4) of this section prior to use as a school building. In the event that emergency use of an uninspected building as a school building is necessitated, such buildings shall be inspected within 30 days after commencement of such use.

(3) Each inspection shall be made by an accredited inspector.

(4) For each area of a school building, except as excluded under § 763.99, each person performing an inspection shall:

(i) Visually inspect the area to identify the locations of all suspected ACBM.

(ii) Touch all suspected ACBM to determine whether they are friable.

(iii) Identify all homogeneous areas of friable suspected ACBM and all homogeneous areas of nonfriable suspected ACBM.

(iv) Assume that some or all of the homogeneous areas are ACM, and, for each homogeneous area that is not assumed to be ACM, collect and submit for analysis bulk samples under §§ 763.86 and 763.87.

(v) Assess, under § 763.88, 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.

(vi) Record the following and submit to the person designated under § 763.84 a copy of such record for inclusion in the management plan within 30 days of the inspection:

(A) An inspection report with the date of the inspection signed by each accredited person making the inspection, State of accreditation, and if applicable, his or her accreditation number.

(B) An inventory of the locations of the homogeneous areas where samples are collected, exact location where each bulk sample is collected, dates that samples are collected, homogeneous areas where friable suspected ACBM is assumed to be ACM, and homogeneous areas where nonfriable suspected ACBM is assumed to be ACM.

(C) A description of the manner used to determine sampling locations, the name and signature of each accredited inspector who collected the samples, State of accreditation, and, if applicable, his or her accreditation number.

(D) A list of whether the homogeneous areas identified under paragraph (a)(4)(vi)(B) of this section, are surfacing material, thermal system insulation, or miscellaneous material.

(E) Assessments made of friable material, the name and signature of each accredited inspector making the assessment, State of accreditation, and if applicable, his or her accreditation number.

(b) *Reinspection*. (1) At least once every 3 years after a management plan is in effect, each local education agency shall conduct a reinspection of all friable and nonfriable known or assumed ACBM in each school building that they lease, own, or otherwise use as a school building.

(2) Each inspection shall be made by an accredited inspector.

(3) For each area of a school building, each person performing a reinspection shall:

(i) Visually reinspect, and reassess, under § 763.88, the condition of all friable known or assumed ACBM.

(ii) Visually inspect material that was previously considered nonfriable ACBM and touch the material to determine whether it has become friable since the last inspection or reinspection.

(iii) Identify any homogeneous areas with material that has become friable since the last inspection or reinspection.

(iv) For each homogeneous area of newly friable material that is already assumed to be ACBM, bulk samples may be collected and submitted for analysis in accordance with §§ 763.86 and 763.87.

(v) Assess, under § 763.88, the condition of the newly friable material in areas where samples are collected, and newly friable materials in areas that are assumed to be ACBM.

(vi) Reassess, under § 763.88, the condition of friable known or assumed ACBM previously identified.

(vii) Record the following and submit to the person designated under § 763.84 a copy of such record for inclusion in the management plan within 30 days of the reinspection:

(A) The date of the reinspection, the name and signature of the person making the reinspection, State of accreditation, and if applicable, his or her accreditation number, and any changes in the condition of known or assumed ACBM.

(B) The exact locations where samples are collected during the reinspection, a description of the manner used to determine sampling locations, the name and signature of each accredited inspector who collected the samples, State of accreditation, and, if applicable, his or her accreditation number.

(C) Any assessments or reassessments made of friable material, the name and signature of the accredited inspector making the assessments, State of accreditation, and if applicable, his or her accreditation number.

(c) *General.* Thermal system insulation that has retained its structural integrity and that has an undamaged protective jacket or wrap that prevents fiber release shall be treated as nonfriable and therefore is subject only to periodic surveillance and preventive measures as necessary.

§ 763.86 Sampling.

(a) *Surfacing material.* An accredited inspector shall collect, in a statistically random manner that is representative of the homogeneous area, bulk samples from each homogeneous area of friable surfacing material that is not assumed to be ACM, and shall collect the samples as follows:

(1) At least three bulk samples shall be collected from each homogeneous area that is 1,000 ft^2 or less, except as provided in § 763.87(c)(2).

(2) At least five bulk samples shall be collected from each homogeneous area that is greater than 1,000 ft^2 but less than or equal to 5,000 ft^2, except as provided in § 763.87(c)(2).

(3) At least seven bulk samples shall be collected from each homogeneous area that is greater than 5,000 ft^2, except as provided in § 763.87(c)(2).

(b) *Thermal system insulation.* (1) Except as provided in paragraphs (b) (2) through (4) of this section and § 763.87(c), an accredited inspector shall collect, in a randomly distributed manner, at least three bulk samples from each homogeneous area of thermal system insulation that is not assumed to be ACM.

(2) Collect at least one bulk sample from each homogeneous area of patched thermal system insulation that is not assumed to be ACM if the patched section is less than 6 linear or square feet.

(3) In a manner sufficient to determine whether the material is ACM or not ACM, collect bulk samples from each insulated mechanical system that is not assumed to be ACM where cement or plaster is used on fittings such as tees, elbows, or valves, except as provided under § 763.87(c)(2).

(4) Bulk samples are not required to be collected from any homogeneous area where the accredited inspector has determined that the thermal system insulation is fiberglass, foam glass, rubber, or other non-ACBM.

(c) *Miscellaneous material.* In a manner sufficient to determine whether material is ACM or not ACM, an accredited inspector shall collect bulk samples from each homogeneous area of friable miscellaneous material that is not assumed to be ACM.

(d) *Nonfriable suspected ACBM.* If any homogeneous area of nonfriable suspected ACBM is not assumed to be ACM, then an accredited inspector shall collect, in a manner sufficient to determine whether the material is ACM or not ACM, bulk samples from the homogeneous area of nonfriable suspected ACBM that is not assumed to be ACM.

§ 763.87 Analysis.

(a) Local education agencies shall have bulk samples, collected under § 763.86 and submitted for analysis, analyzed for asbestos using laboratories accredited by the National Bureau of Standards (NBS). Local education agencies shall use laboratories which have received interim accreditation for polarized light microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program until the NBS PLM laboratory accreditation program for PLM is operational.

(b) Bulk samples shall not be composited for analysis and shall be analyzed for asbestos content by PLM, using the ''Interim Method for the Determination of Asbestos in Bulk Insulation Samples'' found at appendix E to subpart E of this part.

(c)(1) A homogeneous area is considered not to contain ACM only if the results of all samples required to be collected from the area show asbestos in amounts of 1 percent or less.

(2) A homogeneous area shall be determined to contain ACM based on a finding that the results of at least one sample collected from that area shows that asbestos is present in an amount greater than 1 percent.

(d) The name and address of each laboratory performing an analysis, the date of analysis, and the name and signature of the person performing the analysis shall be submitted to the person designated under § 763.84 for inclusion into the management plan within 30 days of the analysis.

[52 FR 41846, Oct. 30, 1987, as amended at 60 FR 31922, June 19, 1995]

§ 763.88 Assessment.

(a)(1) For each inspection and reinspection conducted under § 763.85 (a) and (c) and previous inspections specified under § 763.99, the local education agency shall have an accredited inspector provide a written assessment of all friable known or assumed ACBM in the school building.

(2) Each accredited inspector providing a written assessment shall sign and date the assessment, provide his or her State of accreditation, and if applicable, accreditation number, and submit a copy of the assessment to the person designated under § 763.84 for inclusion in the management plan within 30 days of the assessment.

(b) The inspector shall classify and give reasons in the written assessment for classifying the ACBM and suspected ACBM assumed to be ACM in the school building into one of the following categories:

(1) Damaged or significantly damaged thermal system insulation ACM.

(2) Damaged friable surfacing ACM.

(3) Significantly damaged friable surfacing ACM.

(4) Damaged or significantly damaged friable miscellaneous ACM.

(5) ACBM with potential for damage.

(6) ACBM with potential for significant damage.

(7) Any remaining friable ACBM or friable suspected ACBM.

(c) Assessment may include the following considerations:

(1) Location and the amount of the material, both in total quantity and as a percentage of the functional space.

(2) Condition of the material, specifying:

(i) Type of damage or significant damage (e.g., flaking, blistering, water damage, or 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 or 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., air erosion, vandalism, vibration, water).

(6) Preventive measures which might eliminate the reasonable likelihood of undamaged ACM from becoming significantly damaged.

(d) The local education agency shall select a person accredited to develop management plans to review the results of each inspection, reinspection, and assessment for the school building

and to conduct any other necessary activities in order to recommend in writing to the local education agency appropriate response actions. The accredited person shall sign and date the recommendation, provide his or her State of accreditation, and, if applicable, provide his or her accreditation number, and submit a copy of the recommendation to the person designated under §763.84 for inclusion in the management plan.

§ 763.90 Response actions.

(a) The local education agency shall select and implement in a timely manner the appropriate response actions in this section consistent with the assessment conducted in §763.88. The response actions selected shall be sufficient to protect human health and the environment. The local education agency may then select, from the response actions which protect human health and the environment, that action which is the least burdensome method. Nothing in this section shall be construed to prohibit removal of ACBM from a school building at any time, should removal be the preferred response action of the local education agency.

(b) If damaged or significantly damaged thermal system insulation ACM is present in a building, the local education agency shall:

(1) At least repair the damaged area.

(2) Remove the damaged material if it is not feasible, due to technological factors, to repair the damage.

(3) Maintain all thermal system insulation ACM and its covering in an intact state and undamaged condition.

(c)(1) If damaged friable surfacing ACM or damaged friable miscellaneous ACM is present in a building, the local education agency shall select from among the following response actions: encapsulation, enclosure, removal, or repair of the damaged material.

(2) In selecting the response action from among those which meet the definitional standards in §763.83, the local education agency shall determine which of these response actions protects human health and the environment. For purposes of determining which of these response actions are the least burdensome, the local education agency may then consider local circumstances, including occupancy and use patterns within the school building, and its economic concerns, including short- and long-term costs.

(d) If significantly damaged friable surfacing ACM or significantly damaged friable miscellaneous ACM is present in a building the local education agency shall:

(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, depending upon whether enclosure or encapsulation would be sufficient to protect human health and the environment, enclose or encapsulate.

(e) If any friable surfacing ACM, thermal system insulation ACM, or friable miscellaneous ACM that has potential for damage is present in a building, the local education agency shall at least implement an operations and maintenance (O&M) program, as described under §763.91.

(f) If any friable surfacing ACM, thermal system insulation ACM, or friable miscellaneous ACM that has potential for significant damage is present in a building, the local education agency shall:

(1) Implement an O&M program, as described under §763.91.

(2) Institute preventive measures appropriate to eliminate the reasonable likelihood that the ACM or its covering will become significantly damaged, deteriorated, or delaminated.

(3) Remove the material as soon as possible if appropriate preventive measures cannot be effectively implemented, or unless other response actions are determined to protect human health and the environment. Immediately isolate the area and restrict access if necessary to avoid an imminent and substantial endangerment to human health or the environment.

(g) Response actions including removal, encapsulation, enclosure, or repair, other than small-scale, short-duration repairs, shall be designed and conducted by persons accredited to design and conduct response actions.

(h) The requirements of this subpart E in no way supersede the worker protection and work practice requirements under 29 CFR 1926.58 (Occupational Safety and Health Administration (OSHA) asbestos worker protection standards for construction), 40 CFR part 763, subpart G (EPA asbestos worker protection standards for public employees), and 40 CFR part 61, subpart M (National Emission Standards for Hazardous Air Pollutants—Asbestos).

(i) Completion of response actions. (1) At the conclusion of any action to remove, encapsulate, or enclose ACBM or material assumed to be ACBM, a person designated by the local education agency shall visually inspect each functional space where such action was conducted to determine whether the action has been properly completed.

(2)(i) A person designated by the local education agency shall collect air samples using aggressive sampling as described in appendix A to this subpart E to monitor air for clearance after each removal, encapsulation, and enclosure project involving ACBM, except for projects that are of small-scale, short-duration.

(ii) Local education agencies shall have air samples collected under this section analyzed for asbestos using laboratories accredited by the National Bureau of Standards to conduct such analysis using transmission electron microscopy (TEM) or, under circumstances permitted in this section, laboratories enrolled in the American Industrial Hygiene Association Proficiency Analytical Testing Program for phase contrast microscopy (PCM).

(iii) Until the National Bureau of Standards TEM laboratory accreditation program is operational, local educational agencies shall use laboratories that use the protocol described in appendix A to subpart E of this part.

(3) Except as provided in paragraphs (i)(4), and (i)(5), of this section, an action to remove, encapsulate, or enclose ACBM shall be considered complete when the average concentration of asbestos of five air samples collected within the affected functional space and analyzed by the TEM method in appendix A of this subpart E, is not statistically significantly different, as determined by the Z-test calculation found in appendix A of this subpart E, from the average asbestos concentration of five air samples collected at the same time outside the affected functional space and analyzed in the same manner, and the average asbestos concentration of the three field blanks described in appendix A of this subpart E is below the filter background level, as defined in appendix A of this subpart E, of 70 structures per square millimeter (70 s/mm^2).

(4) An action may also be considered complete if the volume of air drawn for each of the five samples collected within the affected functional space is equal to or greater than 1,199 L of air for a 25 mm filter or equal to or greater than 2,799 L of air for a 37 mm filter, and the average concentration of asbestos as analyzed by the TEM method in appendix A of this subpart E, for the five air samples does not exceed the filter background level, as defined in appendix A, of 70 structures per square millimeter (70 s/mm^2). If the average concentration of asbestos of the five air samples within the affected functional space exceeds 70 s/mm^2, or if the volume of air in each of the samples is less than 1,199 L of air for a 25 mm filter or less than 2,799 L of air for a 37 mm filter, the action shall be considered complete only when the requirements of paragraph (i)(3) or (i)(5), of this section are met.

(5) At any time, a local education agency may analyze air monitoring samples collected for clearance purposes by phase contrast microscopy (PCM) to confirm completion of removal, encapsulation, or enclosure of ACBM that is greater than small-scale, short-duration and less than or equal to 160 square feet or 260 linear feet. The action shall be considered complete when the results of samples collected in the affected functional space and analyzed by phase contrast microscopy using the National Institute for Occupational Safety and Health (NIOSH) Method 7400 entitled ''Fibers'' published in the NIOSH Manual of Analytical Methods, 3rd Edition, Second Supplement, August 1987, show that the concentration of fibers for each of the five samples is less than or equal to a

limit of quantitation for PCM (0.01 fibers per cubic centimeter (0.01 f/cm^3) of air). The method is available for public inspection at the Non-Confidential Information Center (NCIC) (7407), Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency, Room B–607 NEM, 401 M St., SW., Washington, DC 20460, between the hours of 12 p.m. and 4 p.m. weekdays excluding legal holidays or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal__register/code__of__federal__regulations/ibr__locations.html*. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. The method is incorporated as it exists on the effective date of this rule, and a notice of any change to the method will be published in the FEDERAL REGISTER.

(6) To determine the amount of ACBM affected under paragraph (i)(5) of this section, the local education agency shall add the total square or linear footage of ACBM within the containment barriers used to isolate the functional space for the action to remove, encapsulate, or enclose the ACBM. Contiguous portions of material subject to such action conducted concurrently or at approximately the same time within the same school building shall not be separated to qualify under paragraph (i)(5), of this section.

[52 FR 41846, Oct. 30, 1987, as amended at 53 FR 12525, Apr. 15, 1988; 60 FR 31922, June 19, 1995; 60 FR 34465, July 3, 1995; 69 FR 18803, Apr. 9, 2004]

§ 763.91 Operations and maintenance.

(a) *Applicability*. The local education agency shall implement an operations, maintenance, and repair (O&M) program under this section whenever any friable ACBM is present or assumed to be present in a building that it leases, owns, or otherwise uses as a school building. Any material identified as nonfriable ACBM or nonfriable assumed ACBM must be treated as friable ACBM for purposes of this section when the material is about to become friable as a result of activities performed in the school building.

(b) *Worker protection*. Local education agencies must comply with either the OSHA Asbestos Construction Standard at 29 CFR 1926.1101, or the Asbestos Worker Protection Rule at 40 CFR 763.120, whichever is applicable.

(c) *Cleaning*—(1) *Initial cleaning*. Unless the building has been cleaned using equivalent methods within the previous 6 months, all areas of a school building where friable ACBM, damaged or significantly damaged thermal system insulation ACM, or friable suspected ACBM assumed to be ACM are present shall be cleaned at least once after the completion of the inspection required by §763.85(a) and before the initiation of any response action, other than O&M activities or repair, according to the following procedures:

(i) HEPA-vacuum or steam-clean all carpets.

(ii) HEPA-vacuum or wet-clean all other floors and all other horizontal surfaces.

(iii) Dispose of all debris, filters, mopheads, and cloths in sealed, leaktight containers.

(2) *Additional cleaning*. The accredited management planner shall make a written recommendation to the local education agency whether additional cleaning is needed, and if so, the methods and frequency of such cleaning.

(d) *Operations and maintenance activities*. The local education agency shall ensure that the procedures described below to protect building occupants shall be followed for any operations and maintenance activities disturbing friable ACBM:

(1) Restrict entry into the area by persons other than those necessary to perform the maintenance project, either by physically isolating the area or by scheduling.

(2) Post signs to prevent entry by unauthorized persons.

(3) Shut off or temporarily modify the air-handling system and restrict other sources of air movement.

(4) Use work practices or other controls, such as, wet methods, protective clothing, HEPA-vacuums, mini-enclosures, glove bags, as necessary to inhibit the spread of any released fibers.

(5) Clean all fixtures or other components in the immediate work area.

(6) Place the asbestos debris and other cleaning materials in a sealed, leak-tight container.

(e) *Maintenance activities other than small-scale, short-duration.* The response action for any maintenance activities disturbing friable ACBM, other than small-scale, short-duration maintenance activities, shall be designed by persons accredited to design response actions and conducted by persons accredited to conduct response actions.

(f) *Fiber release episodes*—(1) *Minor fiber release episode.* The local education agency shall ensure that the procedures described below are followed in the event of a minor fiber release episode (i.e., the falling or dislodging of 3 square or linear feet or less of friable ACBM): 5

(i) Thoroughly saturate the debris using wet methods.

(ii) Clean the area, as described in paragraph (e) of this section.

(iii) Place the asbestos debris in a sealed, leak-tight container.

(iv) Repair the area of damaged ACM with materials such as asbestos-free spackling, plaster, cement, or insulation, or seal with latex paint or an encapsulant, or immediately have the appropriate response action implemented as required by § 763.90.

(2) *Major fiber release episode.* The local education agency shall ensure that the procedures described below are followed in the event of a major fiber release episode (i.e., the falling or dislodging of more than 3 square or linear feet of friable ACBM):

(i) Restrict entry into the area and post signs to prevent entry into the area by persons other than those necessary to perform the response action.

(ii) Shut off or temporarily modify the air-handling system to prevent the distribution of fibers to other areas in the building.

(iii) The response action for any major fiber release episode must be designed by persons accredited to design response actions and conducted by persons accredited to conduct response actions.

[52 FR 41846, Oct. 30, 1987, as amended at 65 FR 69216, Nov. 15, 2000]

§ 763.92 Training and periodic surveillance.

(a) *Training.* (1) The local education agency shall ensure, prior to the implementation of the O&M provisions of the management plan, that all members of its maintenance and custodial staff (custodians, electricians, heating/air conditioning engineers, plumbers, etc.) who may work in a building that contains ACBM receive awareness training of at least 2 hours, whether or not they are required to work with ACBM. New custodial and maintenance employees shall be trained within 60 days after commencement of employment. Training shall include, but not be limited to:

(i) Information regarding asbestos and its various uses and forms.

(ii) Information on the health effects associated with asbestos exposure.

(iii) Locations of ACBM identified throughout each school building in which they work.

(iv) Recognition of damage, deterioration, and delamination of ACBM.

(v) Name and telephone number of the person designated to carry out general local education agency responsibilities under § 763.84 and the availability and location of the management plan.

(2) The local education agency shall ensure that all members of its maintenance and custodial staff who conduct any activities that will result in the disturbance of ACBM shall receive training described in paragraph (a)(1) of this section and 14 hours of additional training. Additional training shall include, but not be limited to:

(i) Descriptions of the proper methods of handling ACBM.

(ii) Information on the use of respiratory protection as contained in the EPA/NIOSH *Guide to Respiratory Protection for the Asbestos Abatement Industry,* September 1986 (EPA 560/OPPTS–86–001), available from the Director, Environmental Assistance Division (7408), Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency, Room E–543B, 1200 Pennsylvania Ave., NW., Washington, DC 20460, Telephone: (202) 554–1404, TDD: (202) 544–0551 and other personal protection measures.

(iii) The provisions of this section and §763.91, Appendices A, C, and D of this subpart E of this part, EPA regulations contained in 40 CFR part 763, subpart G, and in 40 CFR part 61, subpart M, and OSHA regulations contained in 29 CFR 1926.58.

(iv) Hands-on training in the use of respiratory protection, other personal protection measures, and good work practices.

(3) Local education agency maintenance and custodial staff who have attended EPA-approved asbestos training or received equivalent training for O&M and periodic surveillance activities involving asbestos shall be considered trained for the purposes of this section.

(b) *Periodic surveillance.* (1) At least once every 6 months after a management plan is in effect, each local education agency shall conduct periodic surveillance in each building that it leases, owns, or otherwise uses as a school building that contains ACBM or is assumed to contain ACBM.

(2) Each person performing periodic surveillance shall:

(i) Visually inspect all areas that are identified in the management plan as ACBM or assumed ACBM.

(ii) Record the date of the surveillance, his or her name, and any changes in the condition of the materials.

(iii) Submit to the person designated to carry out general local education agency responsibilities under §763.84 a copy of such record for inclusion in the management plan.

[52 FR 41846, Oct. 30, 1987, as amended at 60 FR 34465, July 3, 1995; 65 FR 69216, Nov. 15, 2000]

§763.93 Management plans.

(a)(1) On or before October 12, 1988, each local education agency shall develop an asbestos management plan for each school, including all buildings that they lease, own, or otherwise use as school buildings, and submit the plan to an Agency designated by the Governor of the State in which the local education agency is located. The plan may be submitted in stages that cover a portion of the school buildings under the authority of the local education agency.

(2) If a building to be used as part of a school is leased or otherwise acquired after October 12, 1988, the local education agency shall include the new building in the management plan for the school prior to its use as a school building. The revised portions of the management plan shall be submitted to the Agency designated by the Governor.

(3) If a local education agency begins to use a building as a school after October 12, 1988, the local education agency shall submit a management plan for the school to the Agency designated by the Governor prior to its use as a school.

(b) On or before October 17, 1987, the Governor of each State shall notify local education agencies in the State regarding where to submit their management plans. States may establish administrative procedures for reviewing management plans. If the Governor does not disapprove a management plan within 90 days after receipt of the plan, the local education agency shall implement the plan.

(c) Each local education agency must begin implementation of its management plan on or before July 9, 1989, and complete implementation in a timely fashion.

(d) Each local education agency shall maintain and update its management plan to keep it current with ongoing operations and maintenance, periodic surveillance, inspection, reinspection, and response action activities. All provisions required to be included in the management plan under this section shall be retained as part of the management plan, as well as any information that has been revised to bring the plan up-to-date.

(e) The management plan shall be developed by an accredited management planner and shall include:

(1) A list of the name and address of each school building and whether the school building contains friable ACBM, nonfriable ACBM, and friable and nonfriable suspected ACBM assumed to be ACM.

(2) For each inspection conducted before the December 14, 1987:

(i) The date of the inspection.

(ii) A blueprint, diagram, or written description of each school building that

identifies clearly each location and approximate square or linear footage of any homogeneous or sampling area where material was sampled for ACM, and, if possible, the exact locations where bulk samples were collected, and the dates of collection.

(iii) A copy of the analyses of any bulk samples, dates of analyses, and a copy of any other laboratory reports pertaining to the analyses.

(iv) A description of any response actions or preventive measures taken to reduce asbestos exposure, including if possible, the names and addresses of all contractors involved, start and completion dates of the work, and results of any air samples analyzed during and upon completion of the work.

(v) A description of assessments, required to be made under § 763.88, of material that was identified before December 14, 1987, as friable ACBM or friable suspected ACBM assumed to be ACM, and the name and signature, State of accreditation, and if applicable, accreditation number of each accredited person making the assessments.

(3) For each inspection and reinspection conducted under § 763.85:

(i) The date of the inspection or reinspection and the name and signature, State of accreditation and, if applicable, the accreditation number of each accredited inspector performing the inspection or reinspection.

(ii) A blueprint, diagram, or written description of each school building that identifies clearly each location and approximate square or linear footage of homogeneous areas where material was sampled for ACM, the exact location where each bulk sample was collected, date of collection, homogeneous areas where friable suspected ACBM is assumed to be ACM, and where nonfriable suspected ACBM is assumed to be ACM.

(iii) A description of the manner used to determine sampling locations, and the name and signature of each accredited inspector collecting samples, the State of accreditation, and if applicable, his or her accreditation number.

(iv) A copy of the analyses of any bulk samples collected and analyzed, the name and address of any laboratory that analyzed bulk samples, a statement that the laboratory meets the applicable requirements of § 763.87(a) the date of analysis, and the name and signature of the person performing the analysis.

(v) A description of assessments, required to be made under § 763.88, of all ACBM and suspected ACBM assumed to be ACM, and the name, signature, State of accreditation, and if applicable, accreditation number of each accredited person making the assessments.

(4) The name, address, and telephone number of the person designated under § 763.84 to ensure that the duties of the local education agency are carried out, and the course name, and dates and hours of training taken by that person to carry out the duties.

(5) The recommendations made to the local education agency regarding response actions, under § 763.88(d), the name, signature, State of accreditation of each person making the recommendations, and if applicable, his or her accreditation number.

(6) A detailed description of preventive measures and response actions to be taken, including methods to be used, for any friable ACBM, the locations where such measures and action will be taken, reasons for selecting the response action or preventive measure, and a schedule for beginning and completing each preventive measure and response action.

(7) With respect to the person or persons who inspected for ACBM and who will design or carry out response actions, except for operations and maintenance, with respect to the ACBM, one of the following statements:

(i) If the State has adopted a contractor accreditation program under section 206(b) of Title II of the Act, a statement that the person(s) is accredited under such plan.

(ii) A statement that the local education agency used (or will use) persons who have been accredited by another State which has adopted a contractor accreditation plan under section 206(b) of Title II of the Act or is accredited by an EPA-approved course under section 206(c) of Title II of the Act.

(8) A detailed description in the form of a blueprint, diagram, or in writing of any ACBM or suspected ACBM assumed to be ACM which remains in the school

once response actions are undertaken pursuant to §763.90. This description shall be updated as response actions are completed.

(9) A plan for reinspection under §763.85, a plan for operations and maintenance activities under §763.91, and a plan for periodic surveillance under §763.92, a description of the recommendation made by the management planner regarding additional cleaning under §763.91(c)(2) as part of an operations and maintenance program, and the response of the local education agency to that recommendation.

(10) A description of steps taken to inform workers and building occupants, or their legal guardians, about inspections, reinspections, response actions, and post-response action activities, including periodic reinspection and surveillance activities that are planned or in progress.

(11) An evaluation of the resources needed to complete response actions successfully and carry out reinspection, operations and maintenance activities, periodic surveillance and training.

(12) With respect to each consultant who contributed to the management plan, the name of the consultant and one of the following statements:

(i) If the State has adopted a contractor accreditation plan under section 206(b) of Title II of the Act, a statement that the consultant is accredited under such plan.

(ii) A statement that the contractor is accredited by another State which has adopted a contractor accreditation plan under section 206(b) of Title II of the Act, or is accredited by an EPA-approved course developed under section 206(c) of Title II of the Act.

(f) A local education agency may require each management plan to contain a statement signed by an accredited management plan developer that such person has prepared or assisted in the preparation of such plan or has reviewed such plan, and that such plan is in compliance with this subpart E. Such statement may not be signed by a person who, in addition to preparing or assisting in preparing the management plan, also implements (or will implement) the management plan.

(g)(1) Upon submission of a management plan to the Governor for review, a local education agency shall keep a copy of the plan in its administrative office. The management plans shall be available, without cost or restriction, for inspection by representatives of EPA and the State, the public, including teachers, other school personnel and their representatives, and parents. The local education agency may charge a reasonable cost to make copies of management plans.

(2) Each local education agency shall maintain in its administrative office a complete, updated copy of a management plan for each school under its administrative control or direction. The management plans shall be available, during normal business hours, without cost or restriction, for inspection by representatives of EPA and the State, the public, including teachers, other school personnel and their representatives, and parents. The local education agency may charge a reasonable cost to make copies of management plans.

(3) Each school shall maintain in its administrative office a complete, updated copy of the management plan for that school. Management plans shall be available for inspection, without cost or restriction, to workers before work begins in any area of a school building. The school shall make management plans available for inspection to representatives of EPA and the State, the public, including parents, teachers, and other school personnel and their representatives within 5 working days after receiving a request for inspection. The school may charge a reasonable cost to make copies of the management plan.

(4) Upon submission of its management plan to the Governor and at least once each school year, the local education agency shall notify in writing parent, teacher, and employee organizations of the availability of management plans and shall include in the management plan a description of the steps taken to notify such organizations, and a dated copy of the notification. In the absence of any such organizations for parents, teachers, or employees, the local education agency

shall provide written notice to that relevant group of the availability of management plans and shall include in the management plan a description of the steps taken to notify such groups, and a dated copy of the notification.

(h) Records required under § 763.94 shall be made by local education agencies and maintained as part of the management plan.

(i) Each management plan must contain a true and correct statement, signed by the individual designated by the local education agency under § 763.84, which certifies that the general, local education agency responsibilities, as stipulated by § 763.84, have been met or will be met.

§ 763.94 Recordkeeping.

(a) Records required under this section shall be maintained in a centralized location in the administrative office of both the school and the local education agency as part of the management plan. For each homogeneous area where all ACBM has been removed, the local education agency shall ensure that such records are retained for 3 years after the next reinspection required under § 763.85(b)(1), or for an equivalent period.

(b) For each preventive measure and response action taken for friable and nonfriable ACBM and friable and nonfriable suspected ACBM assumed to be ACM, the local education agency shall provide:

(1) A detailed written description of the measure or action, including methods used, the location where the measure or action was taken, reasons for selecting the measure or action, start and completion dates of the work, names and addresses of all contractors involved, and if applicable, their State of accreditation, and accreditation numbers, and if ACBM is removed, the name and location of storage or disposal site of the ACM.

(2) The name and signature of any person collecting any air sample required to be collected at the completion of certain response actions specified by § 763.90(i), the locations where samples were collected, date of collection, the name and address of the laboratory analyzing the samples, the date of analysis, the results of the analysis, the method of analysis, the name and signature of the person performing the analysis, and a statement that the laboratory meets the applicable requirements of § 763.90(i)(2)(ii).

(c) For each person required to be trained under § 763.92(a) (1) and (2), the local education agency shall provide the person's name and job title, the date that training was completed by that person, the location of the training, and the number of hours completed in such training.

(d) For each time that periodic surveillance under § 763.92(b) is performed, the local education agency shall record the name of each person performing the surveillance, the date of the surveillance, and any changes in the conditions of the materials.

(e) For each time that cleaning under § 763.91(c) is performed, the local education agency shall record the name of each person performing the cleaning, the date of such cleaning, the locations cleaned, and the methods used to perform such cleaning.

(f) For each time that operations and maintenance activities under § 763.91(d) are performed, the local education agency shall record the name of each person performing the activity, the start and completion dates of the activity, the locations where such activity occurred, a description of the activity including preventive measures used, and if ACBM is removed, the name and location of storage or disposal site of the ACM.

(g) For each time that major asbestos activity under § 763.91(e) is performed, the local education agency shall provide the name and signature, State of accreditation, and if applicable, the accreditation number of each person performing the activity, the start and completion dates of the activity, the locations where such activity occurred, a description of the activity including preventive measures used, and if ACBM is removed, the name and location of storage or disposal site of the ACM.

(h) For each fiber release episode under § 763.91(f), the local education agency shall provide the date and location of the episode, the method of repair, preventive measures or response action taken, the name of each person performing the work, and if ACBM is

removed, the name and location of storage or disposal site of the ACM.

(Approved by the Office of Management and Budget under control number 2070–0091)

§ 763.95 Warning labels.

(a) The local education agency shall attach a warning label immediately adjacent to any friable and nonfriable ACBM and suspected ACBM assumed to be ACM located in routine maintenance areas (such as boiler rooms) at each school building. This shall include:

(1) Friable ACBM that was responded to by a means other than removal.

(2) ACBM for which no response action was carried out.

(b) All labels shall be prominently displayed in readily visible locations and shall remain posted until the ACBM that is labeled is removed.

(c) The warning label shall read, in print which is readily visible because of large size or bright color, as follows:

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

§ 763.97 Compliance and enforcement.

(a) *Compliance with Title II of the Act.* (1) Section 207(a) of Title II of the Act (15 U.S.C. 2647) makes it unlawful for any local education agency to:

(i) Fail to conduct inspections pursuant to section 203(b) of Title II of the Act, including failure to follow procedures and failure to use accredited personnel and laboratories.

(ii) Knowingly submit false information to the Governor regarding any inspection pursuant to regulations under section 203(i) of Title II of the Act.

(iii) Fail to develop a management plan pursuant to regulations under section 203(i) of Title II of the Act.

(2) Section 207(a) of Title II of the Act (15 U.S.C. 2647) also provides that any local education agency which violates any provision of section 207 shall be liable for a civil penalty of not more than $5,000 for each day during which the violation continues. For the purposes of this subpart, a ''violation'' means a failure to comply with respect to a single school building.

(b) *Compliance with Title I of the Act.* (1) Section 15(1)(D) of Title I of the Act (15 U.S.C. 2614) makes it unlawful for any person to fail or refuse to comply with any requirement of Title II or any rule promulgated or order issued under Title II. Therefore, any person who violates any requirement of this subpart is in violation of section 15 of Title I of the Act.

(2) Section 15(3) of Title I of the Act (15 U.S.C. 2614) makes it unlawful for any person to fail or refuse to establish or maintain records, submit reports, notices or other information, or permit access to or copying of records, as required by this Act or a rule thereunder.

(3) Section 15(4) (15 U.S.C. 2614) of Title I of the Act makes it unlawful for any person to fail or refuse to permit entry or inspection as required by section 11 of Title I of the Act.

(4) Section 16(a) of Title I of the Act (15 U.S.C. 2615) provides that any person who violates any provision of section 15 of Title I of the Act shall be liable to the United States for a civil penalty in an amount not to exceed $25,000 for each such violation. Each day such a violation continues shall, for purposes of this paragraph, constitute a separate violation of section 15. A local education agency is not liable for any civil penalty under Title I of the Act for failing or refusing to comply with any rule promulgated or order issued under Title II of the Act.

(c) *Criminal penalties.* If any violation committed by any person (including a local education agency) is knowing or willful, criminal penalties may be assessed under section 16(b) of Title I of the Act.

(d) *Injunctive relief.* The Agency may obtain injunctive relief under section 208(b) of Title II of the Act to respond to a hazard which poses an imminent and substantial endangerment to human health or the environment or section 17 (15 U.S.C. 2616) of Title I of the Act to restrain any violation of section 15 of Title I of the Act or to compel the taking of any action required by or under Title I of the Act.

(e) *Citizen complaints.* Any citizen who wishes to file a complaint pursuant to section 207(d) of Title II of the Act should direct the complaint to the Governor of the State or the EPA Asbestos Ombudsman, 1200 Pennsylvania Ave., NW., Washington, DC 20460. The citizen complaint should be in writing and

identified as a citizen complaint pursuant to section 207(d) of Title II of TSCA. The EPA Asbestos Ombudsman or the Governor shall investigate and respond to the complaint within a reasonable period of time if the allegations provide a reasonable basis to believe that a violation of the Act has occurred.

(f) *Inspections.* EPA may conduct inspections and review management plans under section 11 of Title I of the Act (15 U.S.C. 2610) to ensure compliance.

§ 763.98 Waiver; delegation to State.

(a) *General.* (1) Upon request from a state Governor and after notice and comment and an opportunity for a public hearing in accordance with paragraphs (b) and (c) of this section, EPA may waive some or all of the requirements of this subpart E if the state has established and is implementing or intends to implement a program of asbestos inspection and management that contains requirements that are at least as stringent as the requirements of this subpart. In addition, if the state chooses to receive electronic documents, the state program must include, at a minimum, the requirements of 40 CFR part 3—(Electronic reporting).

(2) A waiver from any requirement of this subpart E shall apply only to the specific provision for which a waiver has been granted under this section. All requirements of this subpart E shall apply until a waiver is granted under this section.

(b) *Request.* Each request by a Governor to waive any requirement of this subpart E shall be sent with three complete copies of the request to the Regional Administrator for the EPA Region in which the State is located and shall include:

(1) A copy of the State provisions or proposed provisions relating to its program of asbestos inspection and management in schools for which the request is made.

(2)(i) The name of the State agency that is or will be responsible for administering and enforcing the requirements for which a waiver is requested, the names and job titles of responsible officials in that agency, and phone numbers where the officials can be contacted.

(ii) In the event that more than one agency is or will be responsible for administering and enforcing the requirements for which a waiver is requested, a description of the functions to be performed by each agency, how the program will be coordinated by the lead agency to ensure consistency and effective administration in the asbestos inspection and management program within the State, the names and job titles of responsible officials in the agencies, and phone numbers where the officials can be contacted. The lead agency will serve as the central contact point for the EPA.

(3) Detailed reasons, supporting papers, and the rationale for concluding that the state's asbestos inspection and management program provisions for which the request is made are at least as stringent as the requirements of Subpart E of this part, and that, if the state chooses to receive electronic documents, the state program includes, at a minimum, the requirements of 40 CFR part 3—(Electronic reporting).

(4) A discussion of any special situations, problems, and needs pertaining to the waiver request accompanied by an explanation of how the State intends to handle them.

(5) A statement of the resources that the State intends to devote to the administration and enforcement of the provisions relating to the waiver request.

(6) Copies of any specific or enabling State laws (enacted and pending enactment) and regulations (promulgated and pending promulgation) relating to the request, including provisions for assessing criminal and/or civil penalties.

(7) Assurance from the Governor, the Attorney General, or the legal counsel of the lead agency that the lead agency or other cooperating agencies have the legal authority necessary to carry out the requirements relating to the request.

(c) *General notice—hearing.* (1) Within 30 days after receipt of a request for a waiver, EPA will determine the completeness of the request. If EPA does not request further information within

the 30-day period, the request will be deemed complete.

(2) Within 30 days after EPA determines that a request is complete, EPA will issue for publication in the FEDERAL REGISTER a notice that announces receipt of the request, describes the information submitted under paragraph (b) of this section, and solicits written comment from interested members of the public. Comments must be submitted within 60 days.

(3) If, during the comment period, EPA receives a written objection to a Governor's request and a request for a public hearing detailing specific objections to the granting of a waiver, EPA will schedule a public hearing to be held in the affected State after the close of the comment period and will announce the public hearing date in the FEDERAL REGISTER before the date of the hearing. Each comment shall include the name and address of the person submitting the comment.

(d) *Criteria.* EPA may waive some or all of the requirements of subpart E of this part if:

(1) The State's lead agency and other cooperating agencies have the legal authority necessary to carry out the provisions of asbestos inspection and management in schools relating to the waiver request.

(2) The State's program of asbestos inspection and management in schools relating to the waiver request and implementation of the program are or will be at least as stringent as the requirements of this subpart E.

(3) The state has an enforcement mechanism to allow it to implement the program described in the waiver request and any electronic reporting requirements are at least as stringent as 40 CFR part 3—(Electronic reporting).

(4) The lead agency and any cooperating agencies have or will have qualified personnel to carry out the provisions relating to the waiver request.

(5) The State will devote adequate resources to the administration and enforcement of the asbestos inspection and management provisions relating to the waiver request.

(6) When specified by EPA, the State gives satisfactory assurances that necessary steps, including specific actions it proposes to take and a time schedule for their accomplishment, will be taken within a reasonable time to conform with applicable criteria under paragraphs (d) (2) through (4) of this section.

(e) *Decision.* EPA will issue for publication in the FEDERAL REGISTER a notice announcing its decision to grant or deny, in whole or in part, a Governor's request for a waiver from some or all of the requirements of this subpart E within 30 days after the close of the comment period or within 30 days following a public hearing, whichever is applicable. The notice will include the Agency's reasons and rationale for granting or denying the Governor's request. The 30-day period may be extended if mutually agreed upon by EPA and the State.

(f) *Modifications.* When any substantial change is made in the administration or enforcement of a State program for which a waiver was granted under this section, a responsible official in the lead agency shall submit such changes to EPA.

(g) *Reports.* The lead agency in each State that has been granted a waiver by EPA from any requirement of subpart E of this part shall submit a report to the Regional Administrator for the Region in which the State is located at least once every 12 months to include the following information:

(1) A summary of the State's implementation and enforcement activities during the last reporting period relating to provisions waived under this section, including enforcement actions taken.

(2) Any changes in the administration or enforcement of the State program implemented during the last reporting period.

(3) Other reports as may be required by EPA to carry out effective oversight of any requirement of this subpart E that was waived under this section.

(h) *Oversight.* EPA may periodically evaluate the adequacy of a State's implementation and enforcement of and resources devoted to carrying out requirements relating to the waiver. This evaluation may include, but is not limited to, site visits to local education agencies without prior notice to the State.

(i) *Informal conference.* (1) EPA may request that an informal conference be held between appropriate State and EPA officials when EPA has reason to believe that a State has failed to:

(i) Substantially comply with the terms of any provision that was waived under this section.

(ii) Meet the criteria under paragraph (d) of this section, including the failure to carry out enforcement activities or act on violations of the State program.

(2) EPA will:

(i) Specify to the State those aspects of the State's program believed to be inadequate.

(ii) Specify to the State the facts that underlie the belief of inadequacy.

(3) If EPA finds, on the basis of information submitted by the State at the conference, that deficiencies did not exist or were corrected by the State, no further action is required.

(4) Where EPA finds that deficiencies in the State program exist, a plan to correct the deficiencies shall be negotiated between the State and EPA. The plan shall detail the deficiencies found in the State program, specify the steps the State has taken or will take to remedy the deficiencies, and establish a schedule for each remedial action to be initiated.

(j) *Rescission.* (1) If the State fails to meet with EPA or fails to correct deficiencies raised at the informal conference, EPA will deliver to the Governor of the State and a responsible official in the lead agency a written notice of its intent to rescind, in whole or part, the waiver.

(2) EPA will issue for publication in the FEDERAL REGISTER a notice that announces the rescission of the waiver, describes those aspects of the State's program determined to be inadequate, and specifies the facts that underlie the findings of inadequacy.

[52 FR 41846, Oct. 30, 1987, as amended at 70 FR 59889, Oct. 13, 2005]

§ 763.99 Exclusions.

(a) A local education agency shall not be required to perform an inspection under § 763.85(a) in any sampling area as defined in 40 CFR 763.103 or homogeneous area of a school building where:

(1) An accredited inspector has determined that, based on sampling records, friable ACBM was identified in that homogeneous or sampling area during an inspection conducted before December 14, 1987. The inspector shall sign and date a statement to that effect with his or her State of accreditation and if applicable, accreditation number and, within 30 days after such determination, submit a copy of the statement to the person designated under § 763.84 for inclusion in the management plan. However, an accredited inspector shall assess the friable ACBM under § 763.88.

(2) An accredited inspector has determined that, based on sampling records, nonfriable ACBM was identified in that homogeneous or sampling area during an inspection conducted before December 14, 1987. The inspector shall sign and date a statement to that effect with his or her State of accreditation and if applicable, accreditation number and, within 30 days after such determination, submit a copy of the statement to the person designated under § 763.84 for inclusion in the management plan. However, an accredited inspector shall identify whether material that was nonfriable has become friable since that previous inspection and shall assess the newly-friable ACBM under § 763.88.

(3) Based on sampling records and inspection records, an accredited inspector has determined that no ACBM is present in the homogeneous or sampling area and the records show that the area was sampled, before December 14, 1987 in substantial compliance with § 763.85(a), which for purposes of this section means in a random manner and with a sufficient number of samples to reasonably ensure that the area is not ACBM.

(i) The accredited inspector shall sign and date a statement, with his or her State of accreditation and if applicable, accreditation number that the homogeneous or sampling area determined not to be ACBM was sampled in substantial compliance with § 763.85(a).

(ii) Within 30 days after the inspector's determination, the local education agency shall submit a copy of the inspector's statement to the EPA Regional Office and shall include the

statement in the management plan for that school.

(4) The lead agency responsible for asbestos inspection in a State that has been granted a waiver from §763.85(a) has determined that, based on sampling records and inspection records, no ACBM is present in the homogeneous or sampling area and the records show that the area was sampled before December 14, 1987, in substantial compliance with §763.85(a). Such determination shall be included in the management plan for that school.

(5) An accredited inspector has determined that, based on records of an inspection conducted before December 14, 1987, suspected ACBM identified in that homogeneous or sampling area is assumed to be ACM. The inspector shall sign and date a statement to that effect, with his or her State of accreditation and if applicable, accreditation number and, within 30 days of such determination, submit a copy of the statement to the person designated under §763.84 for inclusion in the management plan. However, an accredited inspector shall identify whether material that was nonfriable suspected ACBM assumed to be ACM has become friable since the previous inspection and shall assess the newly friable material and previously identified friable suspected ACBM assumed to be ACM under §763.88.

(6) Based on inspection records and contractor and clearance records, an accredited inspector has determined that no ACBM is present in the homogeneous or sampling area where asbestos removal operations have been conducted before December 14, 1987, and shall sign and date a statement to that effect and include his or her State of accreditation and, if applicable, accreditation number. The local education agency shall submit a copy of the statement to the EPA Regional Office and shall include the statement in the management plan for that school.

(7) An architect or project engineer responsible for the construction of a new school building built after October 12, 1988, or an accredited inspector signs a statement 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. The local education agency shall submit a copy of the signed statement of the architect, project engineer, or accredited inspector to the EPA Regional Office and shall include the statement in the management plan for that school.

(b) The exclusion, under paragraphs (a) (1) through (4) of this section, from conducting the inspection under §763.85(a) shall apply only to homogeneous or sampling areas of a school building that were inspected and sampled before October 17, 1987. The local education agency shall conduct an inspection under §763.85(a) of all areas inspected before October 17, 1987, that were not sampled or were not assumed to be ACM.

(c) If ACBM is subsequently found in a homogeneous or sampling area of a local education agency that had been identified as receiving an exclusion by an accredited inspector under paragraphs (a) (3), (4), (5) of this section, or an architect, project engineer or accredited inspector under paragraph (a)(7) of this section, the local education agency shall have 180 days following the date of identification of ACBM to comply with this subpart E.

APPENDIX A TO SUBPART E OF PART 763—INTERIM TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL METHODS—MANDATORY AND NON-MANDATORY—AND MANDATORY SECTION TO DETERMINE COMPLETION OF RESPONSE ACTIONS

I. Introduction

The following appendix contains three units. The first unit is the mandatory transmission electron microscopy (TEM) method which all laboratories must follow; it is the minimum requirement for analysis of air samples for asbestos by TEM. The mandatory method contains the essential elements of the TEM method. The second unit contains the complete non-mandatory method. The non-mandatory method supplements the mandatory method by including additional steps to improve the analysis. EPA recommends that the non-mandatory method be employed for analyzing air filters; however, the laboratory may choose to employ the mandatory method. The non-mandatory method contains the same minimum requirements as are outlined in the mandatory

method. Hence, laboratories may choose either of the two methods for analyzing air samples by TEM.

The final unit of this Appendix A to subpart E defines the steps which must be taken to determine completion of response actions. This unit is mandatory.

II. Mandatory Transmission Electron Microscopy Method

A. Definitions of Terms

1. *Analytical sensitivity*—Airborne asbestos concentration represented by each fiber counted under the electron microscope. It is determined by the air volume collected and the proportion of the filter examined. This method requires that the analytical sensitivity be no greater than 0.005 structures/cm^3.

2. *Asbestiform*—A specific type of mineral fibrosity in which the fibers and fibrils possess high tensile strength and flexibility.

3. *Aspect ratio*—A ratio of the length to the width of a particle. Minimum aspect ratio as defined by this method is equal to or greater than 5:1.

4. *Bundle*—A structure composed of three or more fibers in a parallel arrangement with each fiber closer than one fiber diameter.

5. *Clean area*—A controlled environment which is maintained and monitored to assure a low probability of asbestos contamination to materials in that space. Clean areas used in this method have HEPA filtered air under positive pressure and are capable of sustained operation with an open laboratory blank which on subsequent analysis has an average of less than 18 structures/mm^2 in an area of 0.057 mm^2 (nominally 10 200-mesh grid openings) and a maximum of 53 structures/mm^2 for any single preparation for that same area.

6. *Cluster*—A structure with fibers in a random arrangement such that all fibers are intermixed and no single fiber is isolated from the group. Groupings must have more than two intersections.

7. *ED*—Electron diffraction.

8. *EDXA*—Energy dispersive X-ray analysis.

9. *Fiber*—A structure greater than or equal to 0.5 μm in length with an aspect ratio (length to width) of 5:1 or greater and having substantially parallel sides.

10. *Grid*—An open structure for mounting on the sample to aid in its examination in the TEM. The term is used here to denote a 200-mesh copper lattice approximately 3 mm in diameter.

11. *Intersection*—Nonparallel touching or crossing of fibers, with the projection having an aspect ratio of 5:1 or greater.

12. *Laboratory sample coordinator*—That person responsible for the conduct of sample handling and the certification of the testing procedures.

13. *Filter background level*—The concentration of structures per square millimeter of filter that is considered indistinguishable from the concentration measured on a blank (filters through which no air has been drawn). For this method the filter background level is defined as 70 structures/mm^2.

14. *Matrix*—Fiber or fibers with one end free and the other end embedded in or hidden by a particulate. The exposed fiber must meet the fiber definition.

15. *NSD*—No structure detected.

16. *Operator*—A person responsible for the TEM instrumental analysis of the sample.

17. *PCM*—Phase contrast microscopy.

18. *SAED*—Selected area electron diffraction.

19. *SEM*—Scanning electron microscope.

20. *STEM*—Scanning transmission electron microscope.

21. *Structure*—a microscopic bundle, cluster, fiber, or matrix which may contain asbestos.

22. *S/cm^3*—Structures per cubic centimeter.

23. *S/mm^2*—Structures per square millimeter.

24. *TEM*—Transmission electron microscope.

B. Sampling

1. The sampling agency must have written quality control procedures and documents which verify compliance.

2. Sampling operations must be performed by qualified individuals completely independent of the abatement contractor to avoid possible conflict of interest (References 1, 2, 3, and 5 of Unit II.J.).

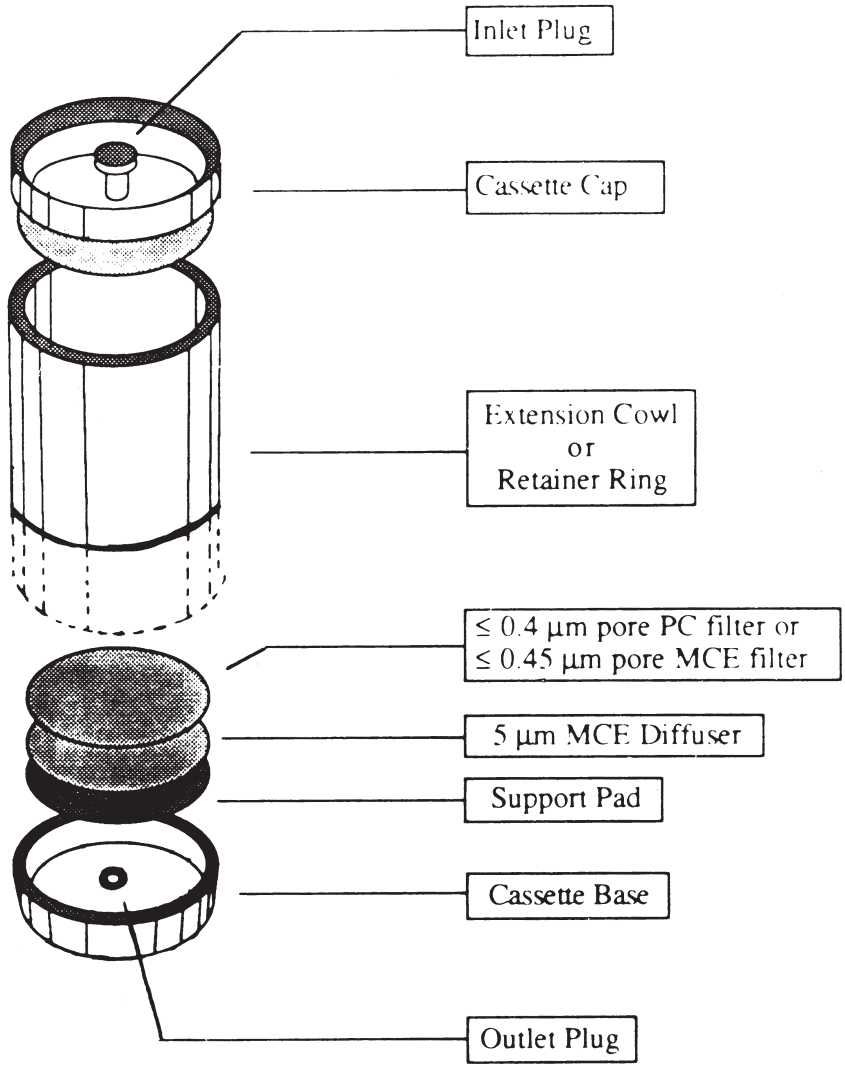
3. Sampling for airborne asbestos following an abatement action must use commercially available cassettes.

4. Prescreen the loaded cassette collection filters to assure that they do not contain concentrations of asbestos which may interfere with the analysis of the sample. A filter blank average of less than 18 s/mm^2 in an area of 0.057 mm^2 (nominally 10 200-mesh grid openings) and a single preparation with a maximum of 53 s/mm^2 for that same area is acceptable for this method.

5. Use sample collection filters which are either polycarbonate having a pore size less than or equal to 0.4 μm or mixed cellulose ester having a pore size less than or equal to 0.45 μm.

6. Place these filters in series with a 5.0 μm backup filter (to serve as a diffuser) and a support pad. See the following Figure 1:

FIGURE I--SAMPLING CASSETTE CONFIGURATION



7. Reloading of used cassettes is not permitted.

8. Orient the cassette downward at approximately 45 degrees from the horizontal.

9. Maintain a log of all pertinent sampling information.

10. Calibrate sampling pumps and their flow indicators over the range of their intended use with a recognized standard. Assemble the sampling system with a representative filter (not the filter which will be used in sampling) before and after the sampling operation.

11. Record all calibration information.

12. Ensure that the mechanical vibrations from the pump will be minimized to prevent transferral of vibration to the cassette.

13. Ensure that a continuous smooth flow of negative pressure is delivered by the pump by damping out any pump action fluctuations if necessary.

14. The final plastic barrier around the abatement area remains in place for the sampling period.

15. After the area has passed a thorough visual inspection, use aggressive sampling conditions to dislodge any remaining dust. (See suggested protocol in Unit III.B.7.d.)

16. Select an appropriate flow rate equal to or greater than 1 liter per minute (L/min) or less than 10 L/min for 25 mm cassettes. Larger filters may be operated at proportionally higher flow rates.

17. A minimum of 13 samples are to be collected for each testing site consisting of the following:

a. A minimum of five samples per abatement area.

b. A minimum of five samples per ambient area positioned at locations representative of the air entering the abatement site.

c. Two field blanks are to be taken by removing the cap for not more than 30 seconds and replacing it at the time of sampling before sampling is initiated at the following places:

i. Near the entrance to each abatement area.

ii. At one of the ambient sites. (DO NOT leave the field blanks open during the sampling period.)

d. A sealed blank is to be carried with each sample set. This representative cassette is not to be opened in the field.

18. Perform a leak check of the sampling system at each indoor and outdoor sampling site by activating the pump with the closed sampling cassette in line. Any flow indicates a leak which must be eliminated before initiating the sampling operation.

19. The following Table I specifies volume ranges to be used:

TABLE 1--NUMBER OF 200 MESH EM GRID OPENINGS (0.0057 MM^2) THAT NEED TO BE ANALYZED TO MAINTAIN SENSITIVITY OF 0.005 STRUCTURES/CC BASED ON VOLUME AND EFFECTIVE FILTER AREA

	Effective Filter Area 385 sq mm		Effective Filter Area 855 sq mm	
	Volume (liters)	# of grid openings	Volume (liters)	# of grid openings
	560	*24*	*1,250*	*24*
	600	23	1,300	23
	700	19	1,400	21
	800	17	1,600	19
	900	15	1,800	17
	1,000	14	2,000	15
	1,100	12	2,200	14
	1,200	**11**	2,400	13
	1,300	**10**	2,600	12
Recommended Volume Range	**1,400**	**10**	**2,800**	**11**
	1,500	**9**	**3,000**	**10**
	1,600	**8**	**3,200**	**9**
	1,700	**8**	**3,400**	**9**
	1,800	**8**	**3,600**	**8**
	1,900	7	**3,800**	**8**
	2,000	7	**4,000**	**8**
	2,100	6	4,200	7
	2,200	6	4,400	7
	2,300	6	4,600	7
	2,400	6	4,800	6
	2,500	5	5,000	6
	2,600	5	5,200	6
	2,700	5	5,400	6
	2,800	5	5,600	5
	2,900	5	5,800	5
	3,000	5	6,000	5
	3,100	4	6,200	5
	3,200	4	6,400	5
	3,300	4	6,600	5
	3,400	4	6,800	4
	3,500	4	7,000	4
	3,600	4	7,200	4
	3,700	4	7,400	4
	3,800	4	7,600	4

Recommended Volume Range

Note minimum volumes required:
25 mm : 560 liters
37 mm : 1250 liters

Filter diameter of 25 mm = effective area of 385 sq mm
Filter diameter of 37 mm = effective area of 855 sq mm

20. Ensure that the sampler is turned upright before interrupting the pump flow.

21. Check that all samples are clearly labeled and that all pertinent information has been enclosed before transfer of the samples to the laboratory.

22. Ensure that the samples are stored in a secure and representative location.

23. Do not change containers if portions of these filters are taken for other purposes.

24. A summary of Sample Data Quality Objectives is shown in the following Table II:

TABLE II--SUMMARY OF SAMPLING AGENCY DATA QUALITY OBJECTIVES

This table summarizes the data quality objectives from the performance of this method in terms of precision, accuracy, completeness, representativeness, and comparability. These objectives are assured by the periodic control checks and reference checks listed here and described in the text of the method.

Unit Operation	QC Check	Frequency	Conformance Expectation
Sampling materials	Sealed blank	1 per I/O site	95%
Sample procedures	Field blanks	2 per I/O site	95%
	Pump calibration	Before and after each field series	90%
Sample custody	Review of chain-of-custody record	Each sample	95% complete
Sample shipment	Review of sending report	Each sample	95% complete

C. Sample Shipment

Ship bulk samples to the analytical laboratory in a separate container from air samples.

D. Sample Receiving

1. Designate one individual as sample coordinator at the laboratory. While that individual will normally be available to receive samples, the coordinator may train and supervise others in receiving procedures for those times when he/she is not available.

2. Bulk samples and air samples delivered to the analytical laboratory in the same container shall be rejected.

E. Sample Preparation

1. All sample preparation and analysis shall be performed by a laboratory independent of the abatement contractor.

2. Wet-wipe the exterior of the cassettes to minimize contamination possibilities before taking them into the clean room facility.

3. Perform sample preparation in a well-equipped clean facility.

NOTE: The clean area is required to have the following minimum characteristics. The area or hood must be capable of maintaining a positive pressure with make-up air being HEPA-filtered. The cumulative analytical blank concentration must average less than 18 s/mm^2 in an area of 0.057 mm^2 (nominally 10 200-mesh grid openings) and a single preparation with a maximum of 53 s/mm^2 for that same area.

4. Preparation areas for air samples must not only be separated from preparation areas for bulk samples, but they must be prepared in separate rooms.

5. Direct preparation techniques are required. The object is to produce an intact film containing the particulates of the filter surface which is sufficiently clear for TEM analysis.

a. TEM Grid Opening Area measurement must be done as follows:

i. The filter portion being used for sample preparation must have the surface collapsed using an acetone vapor technique.

ii. Measure 20 grid openings on each of 20 random 200-mesh copper grids by placing a grid on a glass and examining it under the PCM. Use a calibrated graticule to measure the average field diameters. From the data, calculate the field area for an average grid opening.

iii. Measurements can also be made on the TEM at a properly calibrated low magnification or on an optical microscope at a magnification of approximately 400X by using an eyepiece fitted with a scale that has been calibrated against a stage micrometer. Optical microscopy utilizing manual or automated procedures may be used providing instrument calibration can be verified.

b. TEM specimen preparation from polycarbonate (PC) filters. Procedures as described in Unit III.G. or other equivalent methods may be used.

c. TEM specimen preparation from mixed cellulose ester (MCE) filters.

i. Filter portion being used for sample preparation must have the surface collapsed using an acetone vapor technique or the Burdette procedure (Ref. 7 of Unit II.J.)

ii. Plasma etching of the collapsed filter is required. The microscope slide to which the collapsed filter pieces are attached is placed in a plasma asher. Because plasma ashers vary greatly in their performance, both from unit to unit and between different positions in the asher chamber, it is difficult to specify the conditions that should be used. Insufficient etching will result in a failure to expose embedded filters, and too much etching may result in loss of particulate from the surface. As an interim measure, it is recommended that the time for ashing of a

known weight of a collapsed filter be established and that the etching rate be calculated in terms of micrometers per second. The actual etching time used for the particulate asher and operating conditions will then be set such that a 1–2 μm (10 percent) layer of collapsed surface will be removed.

iii. Procedures as described in Unit III. or other equivalent methods may be used to prepare samples.

F. TEM Method

1. An 80–120 kV TEM capable of performing electron diffraction with a fluorescent screen inscribed with calibrated gradations is required. If the TEM is equipped with EDXA it must either have a STEM attachment or be capable of producing a spot less than 250 nm in diameter at crossover. The microscope shall be calibrated routinely for magnification and camera constant.

2. *Determination of Camera Constant and ED Pattern Analysis.* The camera length of the TEM in ED operating mode must be calibrated before ED patterns on unknown samples are observed. This can be achieved by using a carbon-coated grid on which a thin film of gold has been sputtered or evaporated. A thin film of gold is evaporated on the specimen TEM grid to obtain zone-axis ED patterns superimposed with a ring pattern from the polycrystalline gold film. In practice, it is desirable to optimize the thickness of the gold film so that only one or two sharp rings are obtained on the superimposed ED pattern. Thicker gold film would normally give multiple gold rings, but it will tend to mask weaker diffraction spots from the unknown fibrous particulate. Since the unknown d-spacings of most interest in asbestos analysis are those which lie closest to the transmitted beam, multiple gold rings are unnecessary on zone-axis ED patterns. An average camera constant using multiple gold rings can be determined. The camera constant is one-half the diameter of the rings times the interplanar spacing of the ring being measured.

3. *Magnification Calibration.* The magnification calibration must be done at the fluorescent screen. The TEM must be calibrated at the grid opening magnification (if used) and also at the magnification used for fiber counting. This is performed with a cross grating replica (e.g., one containing 2,160 lines/mm). Define a field of view on the fluorescent screen either by markings or physical boundaries. The field of view must be measurable or previously inscribed with a scale or concentric circles (all scales should be metric). A logbook must be maintained, and the dates of calibration and the values obtained must be recorded. The frequency of calibration depends on the past history of the particular microscope. After any maintenance of the microscope that involved adjustment of the power supplied to the lenses or the high-voltage system or the mechanical disassembly of the electron optical column apart from filament exchange, the magnification must be recalibrated. Before the TEM calibration is performed, the analyst must ensure that the cross grating replica is placed at the same distance from the objective lens as the specimens are. For instruments that incorporate a eucentric tilting specimen stage, all specimens and the cross grating replica must be placed at the eucentric position.

4. While not required on every microscope in the laboratory, the laboratory must have either one microscope equipped with energy dispersive X-ray analysis or access to an equivalent system on a TEM in another laboratory.

5. Microscope settings: 80–120 kV, grid assessment 250–1,000X, then 15,000–20,000X screen magnification for analysis.

6. Approximately one-half (0.5) of the predetermined sample area to be analyzed shall be performed on one sample grid preparation and the remaining half on a second sample grid preparation.

7. Individual grid openings with greater than 5 percent openings (holes) or covered with greater than 25 percent particulate matter or obviously having nonuniform loading must not be analyzed.

8. Reject the grid if:

a. Less than 50 percent of the grid openings covered by the replica are intact.

b. The replica is doubled or folded.

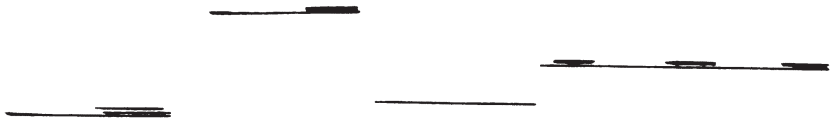
c. The replica is too dark because of incomplete dissolution of the filter.

9. *Recording Rules.*

a. Any continuous grouping of particles in which an asbestos fiber with an aspect ratio greater than or equal to 5:1 and a length greater than or equal to 0.5 μm is detected shall be recorded on the count sheet. These will be designated asbestos structures and will be classified as fibers, bundles, clusters, or matrices. Record as individual fibers any contiguous grouping having 0, 1, or 2 definable intersections. Groupings having more than 2 intersections are to be described as cluster or matrix. An intersection is a nonparallel touching or crossing of fibers, with the projection having an aspect ratio of 5:1 or greater. See the following Figure 2:

FIGURE 2--COUNTING GUIDELINES USED IN DETERMINING ASBESTOS STRUCTURES

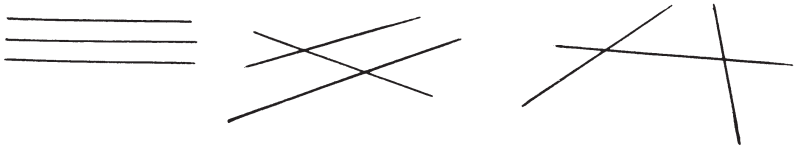
Count as 1 fiber; 1 Structure; no intersections.



Count as 2 fibers if space between fibers is greater than width of 1 fiber diameter or number of intersections is equal to or less than 1.

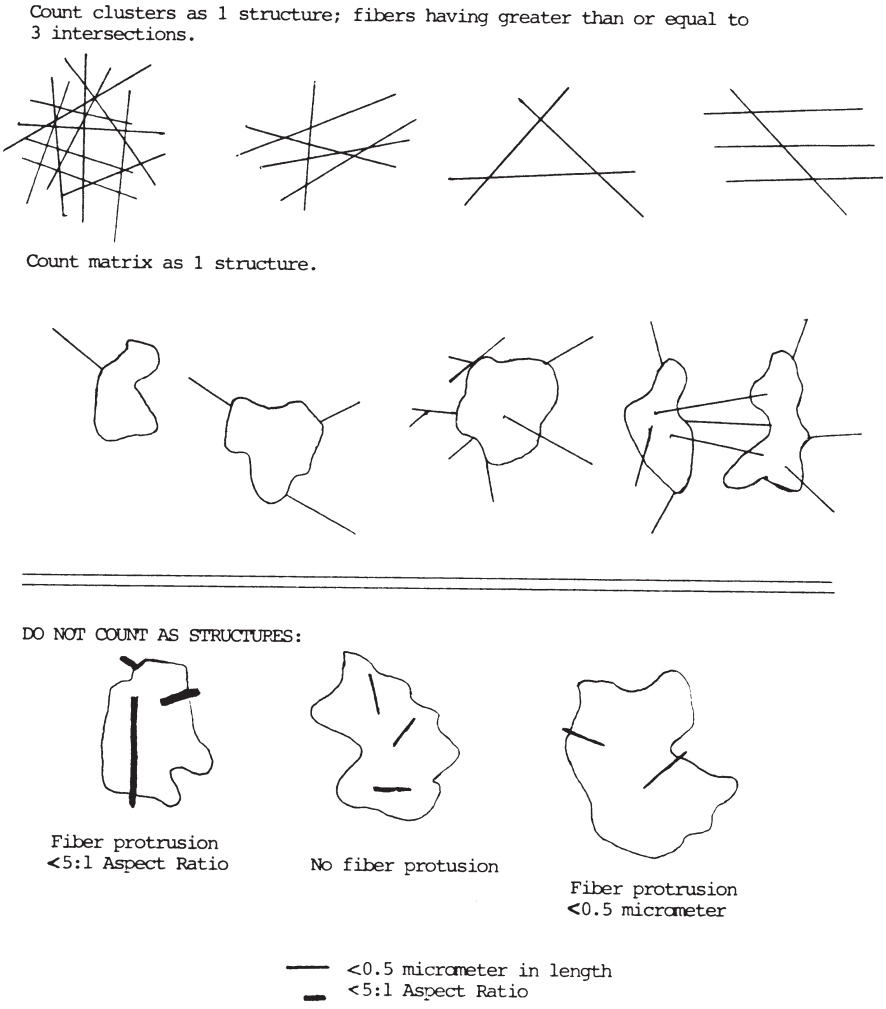


Count as 3 structures if space between fibers is greater than width of 1 fiber diameter or if the number of intersections is equal to or less than 2.



Count bundles as 1 structure; 3 or more parallel fibrils less than 1 fiber diameter separation.





i. *Fiber.* A structure having a minimum length greater than or equal to 0.5 μm and an aspect ratio (length to width) of 5:1 or greater and substantially parallel sides. Note the appearance of the end of the fiber, i.e., whether it is flat, rounded or dovetailed.

ii. *Bundle.* A structure composed of three or more fibers in a parallel arrangement with each fiber closer than one fiber diameter.

iii. *Cluster.* A structure with fibers in a random arrangement such that all fibers are intermixed and no single fiber is isolated from the group. Groupings must have more than two intersections.

iv. *Matrix.* Fiber or fibers with one end free and the other end embedded in or hidden by a particulate. The exposed fiber must meet the fiber definition.

b. Separate categories will be maintained for fibers less than 5 μm and for fibers equal to or greater than 5 μm in length.

c. Record NSD when no structures are detected in the field.

d. Visual identification of electron diffraction (ED) patterns is required for each asbestos structure counted which would cause the

analysis to exceed the 70 s/mm^2 concentration. (Generally this means the first four fibers identified as asbestos must exhibit an identifiable diffraction pattern for chrysotile or amphibole.)

e. The micrograph number of the recorded diffraction patterns must be reported to the client and maintained in the laboratory's quality assurance records. In the event that examination of the pattern by a qualified individual indicates that the pattern has been misidentified visually, the client shall be contacted.

f. Energy Dispersive X-ray Analysis (EDXA) is required of all amphiboles which would cause the analysis results to exceed the 70 s/mm^2 concentration. (Generally speaking, the first 4 amphiboles would require EDXA.)

g. If the number of fibers in the non-asbestos class would cause the analysis to exceed the 70 s/mm^2 concentration, the fact that they are not asbestos must be confirmed by EDXA or measurement of a zone axis diffraction pattern.

h. Fibers classified as chrysotile must be identified by diffraction or X-ray analysis and recorded on a count sheet. X-ray analysis alone can be used only after 70 s/mm^2 have been exceeded for a particular sample.

i. Fibers classified as amphiboles must be identified by X-ray analysis and electron diffraction and recorded on the count sheet. (X-ray analysis alone can be used only after 70 s/mm^2 have been exceeded for a particular sample.)

j. If a diffraction pattern was recorded on film, record the micrograph number on the count sheet.

k. If an electron diffraction was attempted but no pattern was observed, record N on the count sheet.

l. If an EDXA spectrum was attempted but not observed, record N on the count sheet.

m. If an X-ray analysis spectrum is stored, record the file and disk number on the count sheet.

10. Classification Rules.

a. *Fiber.* A structure having a minimum length greater than or equal to 0.5 μm and an aspect ratio (length to width) of 5:1 or greater and substantially parallel sides. Note the appearance of the end of the fiber, i.e., whether it is flat, rounded or dovetailed.

b. *Bundle.* A structure composed of three or more fibers in a parallel arrangement with each fiber closer than one fiber diameter.

c. *Cluster.* A structure with fibers in a random arrangement such that all fibers are intermixed and no single fiber is isolated from the group. Groupings must have more than two intersections.

d. *Matrix.* Fiber or fibers with one end free and the other end embedded in or hidden by a particulate. The exposed fiber must meet the fiber definition.

11. After finishing with a grid, remove it from the microscope, and replace it in the appropriate grid holder. Sample grids must be stored for a minimum of 1 year from the date of the analysis; the sample cassette must be retained for a minimum of 30 days by the laboratory or returned at the client's request.

G. Sample Analytical Sequence

1. Under the present sampling requirements a minimum of 13 samples is to be collected for the clearance testing of an abatement site. These include five abatement area samples, five ambient samples, two field blanks, and one sealed blank.

2. Carry out visual inspection of work site prior to air monitoring.

3. Collect a minimum of 5 air samples inside the work site and 5 samples outside the work site. The indoor and outdoor samples shall be taken during the same time period.

4. Remaining steps in the analytical sequence are contained in Unit IV of this Appendix.

H. Reporting

1. The following information must be reported to the client for each sample analyzed:

a. Concentration in structures per square millimeter and structures per cubic centimeter.

b. Analytical sensitivity used for the analysis.

c. Number of asbestos structures.

d. Area analyzed.

e. Volume of air sampled (which must be initially supplied to lab by client).

f. Copy of the count sheet must be included with the report.

g. Signature of laboratory official to indicate that the laboratory met specifications of the method.

h. Report form must contain official laboratory identification (e.g., letterhead).

i. Type of asbestos.

I. Quality Control/Quality Assurance Procedures (Data Quality Indicators)

Monitoring the environment for airborne asbestos requires the use of sensitive sampling and analysis procedures. Because the test is sensitive, it may be influenced by a variety of factors. These include the supplies used in the sampling operation, the performance of the sampling, the preparation of the grid from the filter and the actual examination of this grid in the microscope. Each of these unit operations must produce a product of defined quality if the analytical result is to be a reliable and meaningful test result. Accordingly, a series of control checks and reference standards are to be performed along with the sample analysis as indicators that the materials used are adequate and the

operations are within acceptable limits. In this way, the quality of the data is defined and the results are of known value. These checks and tests also provide timely and specific warning of any problems which might develop within the sampling and analysis operations. A description of these quality control/quality assurance procedures is summarized in the following Table III:

TABLE III--SUMMARY OF LABORATORY DATA QUALITY OBJECTIVES

Unit Operation	QC Check	Frequency	Conformance Expectation
Sample receiving	Review of receiving report	Each sample	95% complete
Sample custody	Review of chain-of-custody record	Each sample	95% complete
Sample preparation	Supplies and reagents	On receipt	Meet specs. or reject
	Grid opening size	20 openings/20 grids/lot of 1000 or 1 opening/sample	100%
	Special clean area monitoring	After cleaning or service	Meet specs or reclean
	Laboratory blank	1 per prep series or 10%	Meet specs. or reanalyze series
	Plasma etch blank	1 per 20 samples	75%
	Multiple preps (3 per sample)	Each sample	One with cover of 15 complete grid sqs.
Sample analysis	System check	Each day	Each day
	Alignment check	Each day	Each day
	Magnification calibration with low and high standards	Each month or after service	95%
	ED calibration by gold standard	Weekly	95%
	EDS calibration by copper line	Daily	95%
Performance check	Laboratory blank (measure of cleanliness)	Prep 1 per series or 10% read 1 per 25 samples	Meet specs or reanalyze series
	Replicate counting (measure of precision)	1 per 100 samples	1.5 x Poisson Std. Dev.
	Duplicate analysis (measure of reproducibility)	1 per 100 samples	2 x Poisson Std. Dev.
	Known samples of typical materials (working standards)	Training and for comparison with unknowns	100%
	Analysis of NBS SRM 1876 and/or RM 8410 (measure of accuracy and comparability)	1 per analyst per year	1.5 x Poisson Std. Dev.
	Data entry review (data validation and measure of completeness)	Each sample	95%
	Record and verify ID electron diffraction pattern of structure	1 per 5 samples	80% accuracy
Calculations and data reduction	Hand calculation of automated data reduction procedure or independent recalculation of hand-calculated data	1 per 100 samples	85%

1. When the samples arrive at the laboratory, check the samples and documentation for completeness and requirements before initiating the analysis.

2. Check all laboratory reagents and supplies for acceptable asbestos background levels.

3. Conduct all sample preparation in a clean room environment monitored by laboratory blanks. Testing with blanks must also be done after cleaning or servicing the room.

4. Prepare multiple grids of each sample.

5. Provide laboratory blanks with each sample batch. Maintain a cumulative average of these results. If there are more than 53 fibers/mm^2 per 10 200-mesh grid openings, the system must be checked for possible sources of contamination.

6. Perform a system check on the transmission electron microscope daily.

7. Make periodic performance checks of magnification, electron diffraction and energy dispersive X-ray systems as set forth in Table III under Unit II.I.

8. Ensure qualified operator performance by evaluation of replicate analysis and standard sample comparisons as set forth in Table III under Unit II.I.

9. Validate all data entries.

10. Recalculate a percentage of all computations and automatic data reduction steps as specified in Table III under Unit II.I.

11. Record an electron diffraction pattern of one asbestos structure from every five samples that contain asbestos. Verify the identification of the pattern by measurement or comparison of the pattern with patterns collected from standards under the same conditions. The records must also demonstrate that the identification of the pattern has been verified by a qualified individual and that the operator who made the identification is maintaining at least an 80 percent correct visual identification based on his measured patterns.

12. Appropriate logs or records must be maintained by the analytical laboratory verifying that it is in compliance with the mandatory quality assurance procedures.

J. References

For additional background information on this method, the following references should be consulted.

1. ''Guidance for Controlling Asbestos-Containing Materials in Buildings,'' EPA 560/5–85–024, June 1985.

2. ''Measuring Airborne Asbestos Following an Abatement Action,'' USEPA, Office of Pollution Prevention and Toxics, EPA 600/4–85–049, 1985.

3. Small, John and E. Steel. Asbestos Standards: Materials and Analytical Methods. N.B.S. Special Publication 619, 1982.

4. Campbell, W.J., R.L. Blake, L.L. Brown, E.E. Cather, and J.J. Sjoberg. Selected Silicate Minerals and Their Asbestiform Varieties. Information Circular 8751, U.S. Bureau of Mines, 1977.

5. Quality Assurance Handbook for Air Pollution Measurement System. Ambient Air Methods, EPA 600/4–77–027a, USEPA, Office of Research and Development, 1977.

6. Method 2A: Direct Measurement of Gas Volume through Pipes and Small Ducts. 40 CFR Part 60 Appendix A.

7. Burdette, G.J., Health & Safety Exec. Research & Lab. Services Div., London, ''Proposed Analytical Method for Determination of Asbestos in Air.''

8. Chatfield, E.J., Chatfield Tech. Cons., Ltd., Clark, T., PEI Assoc., ''Standard Operating Procedure for Determination of Airborne Asbestos Fibers by Transmission Electron Microscopy Using Polycarbonate Membrane Filters,'' WERL SOP 87–1, March 5, 1987.

9. NIOSH Method 7402 for Asbestos Fibers, 12–11–86 Draft.

10. Yamate, G., Agarwall, S.C., Gibbons, R.D., IIT Research Institute, ''Methodology for the Measurement of Airborne Asbestos by Electron Microscopy,'' Draft report, USEPA Contract 68–02–3266, July 1984.

11. ''Guidance to the Preparation of Quality Assurance Project Plans,'' USEPA, Office of Pollution Prevention and Toxics, 1984.

III. Nonmandatory Transmission Electron Microscopy Method

A. Definitions of Terms

1. *Analytical sensitivity*—Airborne asbestos concentration represented by each fiber counted under the electron microscope. It is determined by the air volume collected and the proportion of the filter examined. This method requires that the analytical sensitivity be no greater than 0.005 s/cm^3.

2. *Asbestiform*—A specific type of mineral fibrosity in which the fibers and fibrils possess high tensile strength and flexibility.

3. *Aspect ratio*—A ratio of the length to the width of a particle. Minimum aspect ratio as defined by this method is equal to or greater than 5:1.

4. *Bundle*—A structure composed of three or more fibers in a parallel arrangement with each fiber closer than one fiber diameter.

5. *Clean area*—A controlled environment which is maintained and monitored to assure a low probability of asbestos contamination to materials in that space. Clean areas used in this method have HEPA filtered air under positive pressure and are capable of sustained operation with an open laboratory blank which on subsequent analysis has an average of less than 18 structures/mm^2 in an area of 0.057 mm^2 (nominally 10 200 mesh grid openings) and a maximum of 53 structures/mm^2 for no more than one single preparation for that same area.

6. *Cluster*—A structure with fibers in a random arrangement such that all fibers are intermixed and no single fiber is isolated from the group. Groupings must have more than two intersections.

7. *ED*—Electron diffraction.

8. *EDXA*—Energy dispersive X-ray analysis.

9. *Fiber*—A structure greater than or equal to 0.5 μm in length with an aspect ratio (length to width) of 5:1 or greater and having substantially parallel sides.

10. *Grid*—An open structure for mounting on the sample to aid in its examination in the TEM. The term is used here to denote a 200-mesh copper lattice approximately 3 mm in diameter.

11. *Intersection*—Nonparallel touching or crossing of fibers, with the projection having an aspect ratio of 5:1 or greater.

12. *Laboratory sample coordinator*—That person responsible for the conduct of sample handling and the certification of the testing procedures.

13. *Filter background level*—The concentration of structures per square millimeter of filter that is considered indistinguishable from the concentration measured on blanks (filters through which no air has been drawn). For this method the filter background level is defined as 70 structures/mm^2.

14. *Matrix*—Fiber or fibers with one end free and the other end embedded in or hidden by a particulate. The exposed fiber must meet the fiber definition.

15. *NSD*—No structure detected.

16. *Operator*—A person responsible for the TEM instrumental analysis of the sample.

17. *PCM*—Phase contrast microscopy.

18. *SAED*—Selected area electron diffraction.

19. *SEM*—Scanning electron microscope.

20. *STEM*—Scanning transmission electron microscope.

21. *Structure*—a microscopic bundle, cluster, fiber, or matrix which may contain asbestos.

22. *S/cm^3*—Structures per cubic centimeter.

23. *S/mm^2*—Structures per square millimeter.

24. *TEM*—Transmission electron microscope.

B. Sampling

1. Sampling operations must be performed by qualified individuals completely independent of the abatement contractor to avoid possible conflict of interest (See References 1, 2, and 5 of Unit III.L.) Special precautions should be taken to avoid contamination of the sample. For example, materials that have not been prescreened for their asbestos background content should not be used; also, sample handling procedures which do not take cross contamination possibilities into account should not be used.

2. Material and supply checks for asbestos contamination should be made on all critical supplies, reagents, and procedures before their use in a monitoring study.

3. Quality control and quality assurance steps are needed to identify problem areas and isolate the cause of the contamination (see Reference 5 of Unit III.L.). Control checks shall be permanently recorded to document the quality of the information produced. The sampling firm must have written quality control procedures and documents which verify compliance. Independent audits by a qualified consultant or firm should be performed once a year. All documentation of compliance should be retained indefinitely to provide a guarantee of quality. A summary of Sample Data Quality Objectives is shown in Table II of Unit II.B.

4. Sampling materials.

a. Sample for airborne asbestos following an abatement action using commercially available cassettes.

b. Use either a cowling or a filter-retaining middle piece. Conductive material may reduce the potential for particulates to adhere to the walls of the cowl.

c. Cassettes must be verified as ''clean'' prior to use in the field. If packaged filters are used for loading or preloaded cassettes are purchased from the manufacturer or a distributor, the manufacturer's name and lot number should be entered on all field data sheets provided to the laboratory, and are required to be listed on all reports from the laboratory.

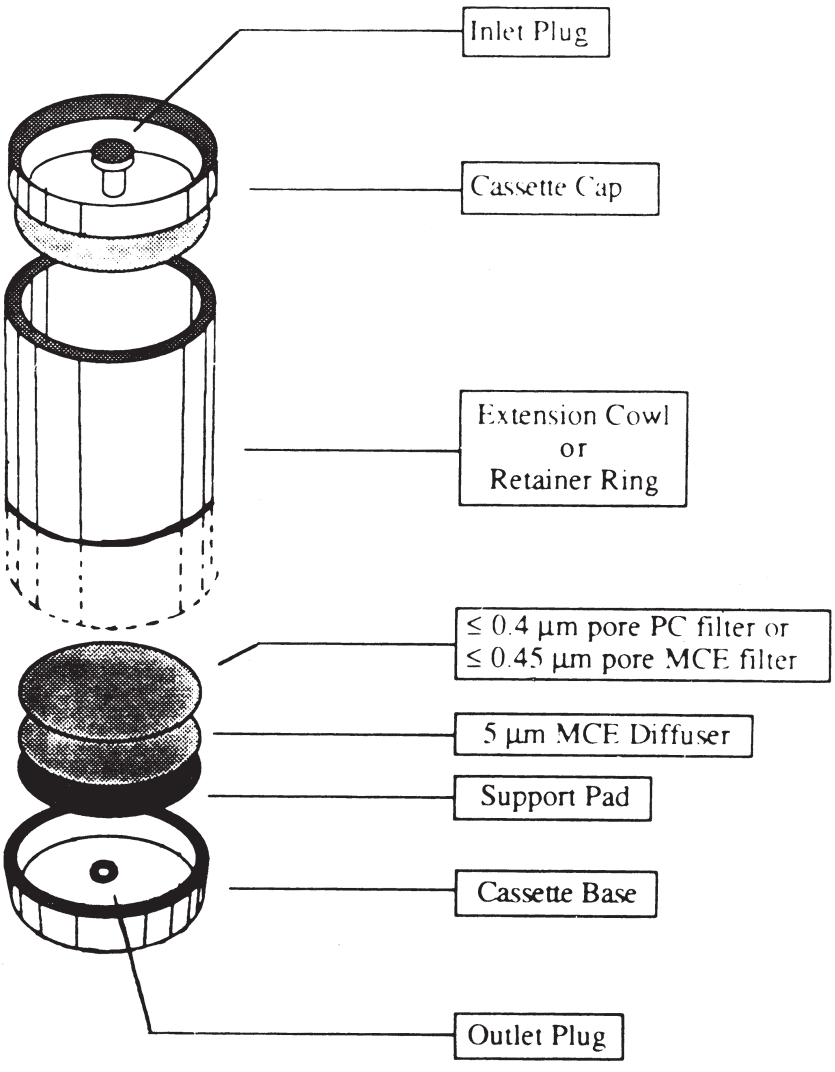
d. Assemble the cassettes in a clean facility (See definition of clean area under Unit III.A.).

e. Reloading of used cassettes is not permitted.

f. Use sample collection filters which are either polycarbonate having a pore size of less than or equal to 0.4 μm or mixed cellulose ester having a pore size of less than or equal to 0.45 μm.

g. Place these filters in series with a backup filter with a pore size of 5.0 μm (to serve as a diffuser) and a support pad. See the following Figure 1:

FIGURE I--SAMPLING CASSETTE CONFIGURATION



h. When polycarbonate filters are used, position the highly reflective face such that the incoming particulate is received on this surface.

i. Seal the cassettes to prevent leakage around the filter edges or between cassette part joints. A mechanical press may be useful to achieve a reproducible leak-free seal.

Shrink fit gel-bands may be used for this purpose and are available from filter manufacturers and their authorized distributors.

j. Use wrinkle-free loaded cassettes in the sampling operation.

5. Pump setup.

a. Calibrate the sampling pump over the range of flow rates and loads anticipated for the monitoring period with this flow measuring device in series. Perform this calibration using guidance from EPA Method 2A each time the unit is sent to the field (See Reference 6 of Unit III.L.).

b. Configure the sampling system to preclude pump vibrations from being transmitted to the cassette by using a sampling stand separate from the pump station and making connections with flexible tubing.

c. Maintain continuous smooth flow conditions by damping out any pump action fluctuations if necessary.

d. Check the sampling system for leaks with the end cap still in place and the pump operating before initiating sample collection. Trace and stop the source of any flow indicated by the flowmeter under these conditions.

e. Select an appropriate flow rate equal to or greater than 1 L/min or less than 10 L/min for 25 mm cassettes. Larger filters may be operated at proportionally higher flow rates.

f. Orient the cassette downward at approximately 45 degrees from the horizontal.

g. Maintain a log of all pertinent sampling information, such as pump identification number, calibration data, sample location, date, sample identification number, flow rates at the beginning, middle, and end, start and stop times, and other useful information or comments. Use of a sampling log form is recommended. See the following Figure 2:

FIGURE 2--SAMPLING LOG FORM

Sample Number	Location of Sample	Pump I.D.	Start Time	Middle Time	End Time	Flow Rate

Inspector: _____ Date: _____

h. Initiate a chain of custody procedure at the start of each sampling, if this is requested by the client.

i. Maintain a close check of all aspects of the sampling operation on a regular basis.

j. Continue sampling until at least the minimum volume is collected, as specified in the following Table I:

TABLE 1--NUMBER OF 200 MESH EM GRID OPENINGS (0.0057 MM^2) THAT NEED TO BE ANALYZED TO MAINTAIN SENSITIVITY OF 0.005 STRUCTURES/CC BASED ON VOLUME AND EFFECTIVE FILTER AREA

	Effective Filter Area 385 sq mm		Effective Filter Area 855 sq mm	
	Volume (liters)	# of grid openings	Volume (liters)	# of grid openings
	560	*24*	*1,250*	*24*
	600	23	1,300	23
	700	19	1,400	21
	800	17	1,600	19
	900	15	1,800	17
	1,000	14	2,000	15
	1,100	12	2,200	14
Recommended Volume Range	**1,200**	**11**	2,400	13
	1,300	**10**	2,600	12
	1,400	**10**	**2,800**	**11**
	1,500	**9**	**3,000**	**10**
	1,600	**8**	**3,200**	**9**
	1,700	**8**	**3,400**	**9**
	1,800	**8**	**3,600**	**8**
	1,900	7	**3,800**	**8**
	2,000	7	**4,000**	**8**
	2,100	6	4,200	7
	2,200	6	4,400	7
	2,300	6	4,600	7
	2,400	6	4,800	6
	2,500	5	5,000	6
	2,600	5	5,200	6
	2,700	5	5,400	6
	2,800	5	5,600	5
	2,900	5	5,800	5
	3,000	5	6,000	5
	3,100	4	6,200	5
	3,200	4	6,400	5
	3,300	4	6,600	5
	3,400	4	6,800	4
	3,500	4	7,000	4
	3,600	4	7,200	4
	3,700	4	7,400	4
	3,800	4	7,600	4
				Recommended Volume Range

Note minimum volumes required:
25 mm : 560 liters
37 mm : 1250 liters

Filter diameter of 25 mm = effective area of 385 sq mm
Filter diameter of 37 mm = effective area of 855 sq mm

k. At the conclusion of sampling, turn the cassette upward before stopping the flow to minimize possible particle loss. If the sampling is resumed, restart the flow before reorienting the cassette downward. Note the condition of the filter at the conclusion of sampling.

l. Double check to see that all information has been recorded on the data collection forms and that the cassette is securely closed and appropriately identified using a waterproof label. Protect cassettes in individual clean resealed polyethylene bags. Bags are to be used for storing cassette caps when they are removed for sampling purposes. Caps and plugs should only be removed or replaced using clean hands or clean disposable plastic gloves.

m. Do not change containers if portions of these filters are taken for other purposes.

6. Minimum sample number per site. A minimum of 13 samples are to be collected for each testing consisting of the following:

a. A minimum of five samples per abatement area.

b. A minimum of five samples per ambient area positioned at locations representative of the air entering the abatement site.

c. Two field blanks are to be taken by removing the cap for not more than 30 sec and replacing it at the time of sampling before sampling is initiated at the following places:

i. Near the entrance to each ambient area.

ii. At one of the ambient sites.

(NOTE: Do not leave the blank open during the sampling period.)

d. A sealed blank is to be carried with each sample set. This representative cassette is not to be opened in the field.

7. Abatement area sampling.

a. Conduct final clearance sampling only after the primary containment barriers have been removed; the abatement area has been thoroughly dried; and, it has passed visual inspection tests by qualified personnel. (See Reference 1 of Unit III.L.)

b. Containment barriers over windows, doors, and air passageways must remain in place until the TEM clearance sampling and analysis is completed and results meet clearance test criteria. The final plastic barrier remains in place for the sampling period.

c. Select sampling sites in the abatement area on a random basis to provide unbiased and representative samples.

d. After the area has passed a thorough visual inspection, use aggressive sampling conditions to dislodge any remaining dust.

i. Equipment used in aggressive sampling such as a leaf blower and/or fan should be properly cleaned and decontaminated before use.

ii. Air filtration units shall remain on during the air monitoring period.

iii. Prior to air monitoring, floors, ceiling and walls shall be swept with the exhaust of a minimum one (1) horsepower leaf blower.

iv. Stationary fans are placed in locations which will not interfere with air monitoring equipment. Fan air is directed toward the ceiling. One fan shall be used for each 10,000 ft^3 of worksite.

v. Monitoring of an abatement work area with high-volume pumps and the use of circulating fans will require electrical power. Electrical outlets in the abatement area may be used if available. If no such outlets are available, the equipment must be supplied with electricity by the use of extension cords and strip plug units. All electrical power supply equipment of this type must be approved Underwriter Laboratory equipment that has not been modified. All wiring must be grounded. Ground fault interrupters should be used. Extreme care must be taken to clean up any residual water and ensure that electrical equipment does not become wet while operational.

vi. Low volume pumps may be carefully wrapped in 6-mil polyethylene to insulate the pump from the air. High volume pumps cannot be sealed in this manner since the heat of the motor may melt the plastic. The pump exhausts should be kept free.

vii. If recleaning is necessary, removal of this equipment from the work area must be handled with care. It is not possible to completely decontaminate the pump motor and parts since these areas cannot be wetted. To minimize any problems in this area, all equipment such as fans and pumps should be carefully wet wiped prior to removal from the abatement area. Wrapping and sealing low volume pumps in 6-mil polyethylene will provide easier decontamination of this equipment. Use of clean water and disposable wipes should be available for this purpose.

e. Pump flow rate equal to or greater than 1 L/min or less than 10 L/min may be used for 25 mm cassettes. The larger cassette diameters may have comparably increased flow.

f. Sample a volume of air sufficient to ensure the minimum quantitation limits. (See Table I of Unit III.B.5.j.)

8. Ambient sampling.

a. Position ambient samplers at locations representative of the air entering the abatement site. If makeup air entering the abatement site is drawn from another area of the building which is outside of the abatement area, place the pumps in the building, pumps should be placed out of doors located near the building and away from any obstructions that may influence wind patterns. If construction is in progress immediately outside the enclosure, it may be necessary to select another ambient site. Samples should be representative of any air entering the work site.

b. Locate the ambient samplers at least 3 ft apart and protect them from adverse weather conditions.

c. Sample same volume of air as samples taken inside the abatement site.

C. Sample Shipment

1. Ship bulk samples in a separate container from air samples. Bulk samples and air samples delivered to the analytical laboratory in the same container shall be rejected.

2. Select a rigid shipping container and pack the cassettes upright in a noncontaminating nonfibrous medium such as a bubble pack. The use of resealable polyethylene bags may help to prevent jostling of individual cassettes.

3. Avoid using expanded polystyrene because of its static charge potential. Also avoid using particle-based packaging materials because of possible contamination.

4. Include a shipping bill and a detailed listing of samples shipped, their descriptions

and all identifying numbers or marks, sampling data, shipper's name, and contact information. For each sample set, designate which are the ambient samples, which are the abatement area samples, which are the field blanks, and which is the sealed blank if sequential analysis is to be performed.

5. Hand-carry samples to the laboratory in an upright position if possible; otherwise choose that mode of transportation least likely to jar the samples in transit.

6. Address the package to the laboratory sample coordinator by name when known and alert him or her of the package description, shipment mode, and anticipated arrival as part of the chain of custody and sample tracking procedures. This will also help the laboratory schedule timely analysis for the samples when they are received.

D. Quality Control/Quality Assurance Procedures (Data Quality Indicators)

Monitoring the environment for airborne asbestos requires the use of sensitive sampling and analysis procedures. Because the test is sensitive, it may be influenced by a variety of factors. These include the supplies used in the sampling operation, the performance of the sampling, the preparation of the grid from the filter and the actual examination of this grid in the microscope. Each of these unit operations must produce a product of defined quality if the analytical result is to be a reliable and meaningful test result. Accordingly, a series of control checks and reference standards is performed along with the sample analysis as indicators that the materials used are adequate and the operations are within acceptable limits. In this way, the quality of the data is defined, and the results are of known value. These checks and tests also provide timely and specific warning of any problems which might develop within the sampling and analysis operations. A description of these quality control/quality assurance procedures is summarized in the text below.

1. Prescreen the loaded cassette collection filters to assure that they do not contain concentrations of asbestos which may interfere with the analysis of the sample. A filter blank average of less than 18 s/mm^2 in an area of 0.057 mm^2 (nominally 10 200-mesh grid openings) and a maximum of 53 s/mm^2 for that same area for any single preparation is acceptable for this method.

2. Calibrate sampling pumps and their flow indicators over the range of their intended use with a recognized standard. Assemble the sampling system with a representative filter—not the filter which will be used in sampling—before and after the sampling operation.

3. Record all calibration information with the data to be used on a standard sampling form.

4. Ensure that the samples are stored in a secure and representative location.

5. Ensure that mechanical calibrations from the pump will be minimized to prevent transferral of vibration to the cassette.

6. Ensure that a continuous smooth flow of negative pressure is delivered by the pump by installing a damping chamber if necessary.

7. Open a loaded cassette momentarily at one of the indoor sampling sites when sampling is initiated. This sample will serve as an indoor field blank.

8. Open a loaded cassette momentarily at one of the outdoor sampling sites when sampling is initiated. This sample will serve as an outdoor field blank.

9. Carry a sealed blank into the field with each sample series. Do not open this cassette in the field.

10. Perform a leak check of the sampling system at each indoor and outdoor sampling site by activating the pump with the closed sampling cassette in line. Any flow indicates a leak which must be eliminated before initiating the sampling operation.

11. Ensure that the sampler is turned upright before interrupting the pump flow.

12. Check that all samples are clearly labeled and that all pertinent information has been enclosed before transfer of the samples to the laboratory.

E. Sample Receiving

1. Designate one individual as sample coordinator at the laboratory. While that individual will normally be available to receive samples, the coordinator may train and supervise others in receiving procedures for those times when he/she is not available.

2. Adhere to the following procedures to ensure both the continued chain-of-custody and the accountability of all samples passing through the laboratory:

a. Note the condition of the shipping package and data written on it upon receipt.

b. Retain all bills of lading or shipping slips to document the shipper and delivery time.

c. Examine the chain-of-custody seal, if any, and the package for its integrity.

d. If there has been a break in the seal or substantive damage to the package, the sample coordinator shall immediately notify the shipper and a responsible laboratory manager before any action is taken to unpack the shipment.

e. Packages with significant damage shall be accepted only by the responsible laboratory manager after discussions with the client.

3. Unwrap the shipment in a clean, uncluttered facility. The sample coordinator or his or her designee will record the contents, including a description of each item and all identifying numbers or marks. A

Sample Receiving Form to document this information is attached for use when necessary. (See the following Figure 3.)

FIGURE 3--SAMPLE RECEIVING FORM

Date of package delivery _____ Package shipped from _____

Carrier _____ Shipping bill retained _____

*Condition of package on receipt_____

*Condition of custody seal _____

Number of samples received _____ Shipping manifest attached _____

Purchase Order No. _____ Project I.D. _____

Comments _____

No.	Description	Sampling Medium PC	Sampling Medium MCE	Sampled Volume Liters	Receiving ID #	Assigned #
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

(Use as many additional sheets as needed.)

Comments _____

Date of acceptance into sample bank _____

Signature of chain-of-custody recipient _____

Disposition of samples_____

*Note: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.

NOTE: The person breaking the chain-of-custody seal and itemizing the contents assumes responsibility for the shipment and signs documents accordingly.

4. Assign a laboratory number and schedule an analysis sequence.

5. Manage all chain-of-custody samples within the laboratory such that their integrity can be ensured and documented.

F. Sample Preparation

1. Personnel not affiliated with the Abatement Contractor shall be used to prepare samples and conduct TEM analysis. Wet-wipe the exterior of the cassettes to minimize contamination possibilities before taking them to the clean sample preparation facility.

2. Perform sample preparation in a well-equipped clean facility.

NOTE: The clean area is required to have the following minimum characteristics. The area or hood must be capable of maintaining a positive pressure with make-up air being HEPA filtered. The cumulative analytical blank concentration must average less than 18 s/mm^2 in an area of 0.057 s/mm^2 (nominally 10 200-mesh grid openings) with no more than one single preparation to exceed 53 s/mm^2 for that same area.

3. Preparation areas for air samples must be separated from preparation areas for bulk samples. Personnel must not prepare air samples if they have previously been preparing bulk samples without performing appropriate personal hygiene procedures, i.e., clothing change, showering, etc.

4. *Preparation.* Direct preparation techniques are required. The objective is to produce an intact carbon film containing the particulates from the filter surface which is sufficiently clear for TEM analysis. Currently recommended direct preparation procedures for polycarbonate (PC) and mixed cellulose ester (MCE) filters are described in Unit III.F.7. and 8. Sample preparation is a subject requiring additional research. Variation on those steps which do not substantively change the procedure, which improve filter clearing or which reduce contamination problems in a laboratory are permitted.

a. Use only TEM grids that have had grid opening areas measured according to directions in Unit III.J.

b. Remove the inlet and outlet plugs prior to opening the cassette to minimize any pressure differential that may be present.

c. Examples of techniques used to prepare polycarbonate filters are described in Unit III.F.7.

d. Examples of techniques used to prepare mixed cellulose ester filters are described in Unit III.F.8.

e. Prepare multiple grids for each sample.

f. Store the three grids to be measured in appropriately labeled grid holders or polyethylene capsules.

5. Equipment.

a. Clean area.

b. Tweezers. Fine-point tweezers for handling of filters and TEM grids.

c. Scalpel Holder and Curved No. 10 Surgical Blades.

d. Microscope slides.

e. Double-coated adhesive tape.

f. Gummed page reinforcements.

g. Micro-pipet with disposal tips 10 to 100 µL variable volume.

h. Vacuum coating unit with facilities for evaporation of carbon. Use of a liquid nitrogen cold trap above the diffusion pump will minimize the possibility of contamination of the filter surface by oil from the pumping system. The vacuum-coating unit can also be used for deposition of a thin film of gold.

i. *Carbon rod electrodes.* Spectrochemically pure carbon rods are required for use in the vacuum evaporator for carbon coating of filters.

j. *Carbon rod sharpener.* This is used to sharpen carbon rods to a neck. The use of necked carbon rods (or equivalent) allows the carbon to be applied to the filters with a minimum of heating.

k. *Low-temperature plasma asher.* This is used to etch the surface of collapsed mixed cellulose ester (MCE) filters. The asher should be supplied with oxygen, and should be modified as necessary to provide a throttle or bleed valve to control the speed of the vacuum to minimize disturbance of the filter. Some early models of ashers admit air too rapidly, which may disturb particulates on the surface of the filter during the etching step.

l. *Glass petri dishes, 10 cm in diameter, 1 cm high.* For prevention of excessive evaporation of solvent when these are in use, a good seal must be provided between the base and the lid. The seal can be improved by grinding the base and lid together with an abrasive grinding material.

m. Stainless steel mesh.

n. Lens tissue.

o. Copper 200-mesh TEM grids, 3 mm in diameter, or equivalent.

p. Gold 200-mesh TEM grids, 3 mm in diameter, or equivalent.

q. Condensation washer.

r. Carbon-coated, 200-mesh TEM grids, or equivalent.

s. Analytical balance, 0.1 mg sensitivity.

t. Filter paper, 9 cm in diameter.

u. Oven or slide warmer. Must be capable of maintaining a temperature of 65–70 °C.

v. Polyurethane foam, 6 mm thickness.

w. Gold wire for evaporation.

6. Reagents.

a. *General.* A supply of ultra-clean, fiber-free water must be available for washing of all components used in the analysis. Water

that has been distilled in glass or filtered or deionized water is satisfactory for this purpose. Reagents must be fiber-free.

b. Polycarbonate preparation method—chloroform.

c. Mixed Cellulose Ester (MCE) preparation method—acetone or the Burdette procedure (Ref. 7 of Unit III.L.).

7. TEM specimen preparation from polycarbonate filters.

a. *Specimen preparation laboratory*. It is most important to ensure that contamination of TEM specimens by extraneous asbestos fibers is minimized during preparation.

b. Cleaning of sample cassettes. Upon receipt at the analytical laboratory and before they are taken into the clean facility or laminar flow hood, the sample cassettes must be cleaned of any contamination adhering to the outside surfaces.

c. Preparation of the carbon evaporator. If the polycarbonate filter has already been carbon-coated prior to receipt, the carbon coating step will be omitted, unless the analyst believes the carbon film is too thin. If there is a need to apply more carbon, the filter will be treated in the same way as an uncoated filter. Carbon coating must be performed with a high-vacuum coating unit. Units that are based on evaporation of carbon filaments in a vacuum generated only by an oil rotary pump have not been evaluated for this application, and must not be used. The carbon rods should be sharpened by a carbon rod sharpener to necks of about 4 mm long and 1 mm in diameter. The rods are installed in the evaporator in such a manner that the points are approximately 10 to 12 cm from the surface of a microscope slide held in the rotating and tilting device.

d. Selection of filter area for carbon coating. Before preparation of the filters, a 75 mm×50 mm microscope slide is washed and dried. This slide is used to support strips of filter during the carbon evaporation. Two parallel strips of double-sided adhesive tape are applied along the length of the slide. Polycarbonate filters are easily stretched during handling, and cutting of areas for further preparation must be performed with great care. The filter and the MCE backing filter are removed together from the cassette and placed on a cleaned glass microscope slide. The filter can be cut with a curved scalpel blade by rocking the blade from the point placed in contact with the filter. The process can be repeated to cut a strip approximately 3 mm wide across the diameter of the filter. The strip of polycarbonate filter is separated from the corresponding strip of backing filter and carefully placed so that it bridges the gap between the adhesive tape strips on the microscope slide. The filter strip can be held with fine-point tweezers and supported underneath by the scalpel blade during placement on the microscope slide. The analyst can place several such strips on the same microscope slide, taking care to rinse and wet-wipe the scalpel blade and tweezers before handling a new sample. The filter strips should be identified by etching the glass slide or marking the slide using a marker insoluble in water and solvents. After the filter strip has been cut from each filter, the residual parts of the filter must be returned to the cassette and held in position by reassembly of the cassette. The cassette will then be archived for a period of 30 days or returned to the client upon request.

e. Carbon coating of filter strips. The glass slide holding the filter strips is placed on the rotation-tilting device, and the evaporator chamber is evacuated. The evaporation must be performed in very short bursts, separated by some seconds to allow the electrodes to cool. If evaporation is too rapid, the strips of polycarbonate filter will begin to curl, which will lead to cross-linking of the surface material and make it relatively insoluble in chloroform. An experienced analyst can judge the thickness of carbon film to be applied, and some test should be made first on unused filters. If the film is too thin, large particles will be lost from the TEM specimen, and there will be few complete and undamaged grid openings on the specimen. If the coating is too thick, the filter will tend to curl when exposed to chloroform vapor and the carbon film may not adhere to the support mesh. Too thick a carbon film will also lead to a TEM image that is lacking in contrast, and the ability to obtain ED patterns will be compromised. The carbon film should be as thin as possible and remain intact on most of the grid openings of the TEM specimen intact.

f. Preparation of the Jaffe washer. The precise design of the Jaffe washer is not considered important, so any one of the published designs may be used. A washer consisting of a simple stainless steel bridge is recommended. Several pieces of lens tissue approximately 1.0 cm×0.5 cm are placed on the stainless steel bridge, and the washer is filled with chloroform to a level where the meniscus contacts the underside of the mesh, which results in saturation of the lens tissue. See References 8 and 10 of Unit III.L.

g. Placing of specimens into the Jaffe washer. The TEM grids are first placed on a piece of lens tissue so that individual grids can be picked up with tweezers. Using a curved scalpel blade, the analyst excises three 3 mm square pieces of the carbon-coated polycarbonate filter from the filter strip. The three squares are selected from the center of the strip and from two points between the outer periphery of the active surface and the center. The piece of filter is placed on a TEM specimen grid with the shiny side of the TEM grid facing upwards, and the whole assembly is placed boldly onto the saturated lens tissue in the Jaffe washer. If carbon-coated grids are used, the filter should be

placed carbon-coated side down. The three excised squares of filters are placed on the same piece of lens tissue. Any number of separate pieces of lens tissue may be placed in the same Jaffe washer. The lid is then placed on the Jaffe washer, and the system is allowed to stand for several hours, preferably overnight.

h. *Condensation washing.* It has been found that many polycarbonate filters will not dissolve completely in the Jaffe washer, even after being exposed to chloroform for as long as 3 days. This problem becomes more serious if the surface of the filter was overheated during the carbon evaporation. The presence of undissolved filter medium on the TEM preparation leads to partial or complete obscuration of areas of the sample, and fibers that may be present in these areas of the specimen will be overlooked; this will lead to a low result. Undissolved filter medium also compromises the ability to obtain ED patterns. Before they are counted, TEM grids must be examined critically to determine whether they are adequately cleared of residual filter medium. It has been found that condensation washing of the grids after the initial Jaffe washer treatment, with chloroform as the solvent, clears all residual filter medium in a period of approximately 1 hour. In practice, the piece of lens tissue supporting the specimen grids is transferred to the cold finger of the condensation washer, and the washer is operated for about 1 hour. If the specimens are cleared satisfactorily by the Jaffe washer alone, the condensation washer step may be unnecessary.

8. TEM specimen preparation from MCE filters.

a. This method of preparing TEM specimens from MCE filters is similar to that specified in NIOSH Method 7402. See References 7, 8, and 9 of Unit III.L.

b. Upon receipt at the analytical laboratory, the sample cassettes must be cleaned of any contamination adhering to the outside surfaces before entering the clean sample preparation area.

c. Remove a section from any quadrant of the sample and blank filters.

d. Place the section on a clean microscope slide. Affix the filter section to the slide with a gummed paged reinforcement or other suitable means. Label the slide with a water and solvent-proof marking pen.

e. Place the slide in a petri dish which contains several paper filters soaked with 2 to 3 mL acetone. Cover the dish. Wait 2 to 4 minutes for the sample filter to fuse and clear.

f. Plasma etching of the collapsed filter is required.

i. The microscope slide to which the collapsed filter pieces are attached is placed in a plasma asher. Because plasma ashers vary greatly in their performance, both from unit to unit and between different positions in the asher chamber, it is difficult to specify the conditions that should be used. This is one area of the method that requires further evaluation. Insufficient etching will result in a failure to expose embedded filters, and too much etching may result in loss of particulate from the surface. As an interim measure, it is recommended that the time for ashing of a known weight of a collapsed filter be established and that the etching rate be calculated in terms of micrometers per second. The actual etching time used for a particular asher and operating conditions will then be set such that a 1–2 μm (10 percent) layer of collapsed surface will be removed.

ii. Place the slide containing the collapsed filters into a low-temperature plasma asher, and etch the filter.

g. Transfer the slide to a rotating stage inside the bell jar of a vacuum evaporator. Evaporate a 1 mm×5 mm section of graphite rod onto the cleared filter. Remove the slide to a clean, dry, covered petri dish.

h. Prepare a second petri dish as a Jaffe washer with the wicking substrate prepared from filter or lens paper placed on top of a 6 mm thick disk of clean spongy polyurethane foam. Cut a V-notch on the edge of the foam and filter paper. Use the V-notch as a reservoir for adding solvent. The wicking substrate should be thin enough to fit into the petri dish without touching the lid.

i. Place carbon-coated TEM grids face up on the filter or lens paper. Label the grids by marking with a pencil on the filter paper or by putting registration marks on the petri dish lid and marking with a waterproof marker on the dish lid. In a fume hood, fill the dish with acetone until the wicking substrate is saturated. The level of acetone should be just high enough to saturate the filter paper without creating puddles.

j. Remove about a quarter section of the carbon-coated filter samples from the glass slides using a surgical knife and tweezers. Carefully place the section of the filter, carbon side down, on the appropriately labeled grid in the acetone-saturated petri dish. When all filter sections have been transferred, slowly add more solvent to the wedge-shaped trough to bring the acetone level up to the highest possible level without disturbing the sample preparations. Cover the petri dish. Elevate one side of the petri dish by placing a slide under it. This allows drops of condensed solvent vapors to form near the edge rather than in the center where they would drip onto the grid preparation.

G. TEM Method

1. *Instrumentation.*

a. Use an 80–120 kV TEM capable of performing electron diffraction with a fluorescent screen inscribed with calibrated gradations. If the TEM is equipped with EDXA it must either have a STEM attachment or be capable of producing a spot less than 250 nm

in diameter at crossover. The microscope shall be calibrated routinely (see Unit III.J.) for magnification and camera constant.

b. While not required on every microscope in the laboratory, the laboratory must have either one microscope equipped with energy dispersive X-ray analysis or access to an equivalent system on a TEM in another laboratory. This must be an Energy Dispersive X-ray Detector mounted on TEM column and associated hardware/software to collect, save, and read out spectral information. Calibration of Multi-Channel Analyzer shall be checked regularly for A1 at 1.48 KeV and Cu at 8.04 KeV, as well as the manufacturer's procedures.

i. Standard replica grating may be used to determine magnification (e.g., 2160 lines/mm).

ii. Gold standard may be used to determine camera constant.

c. Use a specimen holder with single tilt and/or double tilt capabilities.

2. Procedure.

a. Start a new Count Sheet for each sample to be analyzed. Record on count sheet: analyst's initials and date; lab sample number; client sample number microscope identification; magnification for analysis; number of predetermined grid openings to be analyzed; and grid identification. See the following Figure 4:

FIGURE 4--COUNT SHEET

Lab Sample No. _____ Filter Type _____ Operator _____
Client Sample No. _____ Filter Area _____ Date _____
Instrument I.D. _____ Grid I.D. _____ Comments _____
Magnification _____ Grid Opening (GO) Area _____ _____
Acc. Voltage _____ No. GO to be Analyzed _____ _____

GO	Structure No.	Structure Type*	Length		ED Observation				EDAX
			< 5μm	≥ 5 μm	Chrys.	Amph.	Nonasb.	Neg. ID	

GO	Structure No.	Structure Type*	Length		ED Observation				EDAX
			< 5μm	≥ 5 μm	Chrys.	Amph.	Nonasb.	Neg. ID	

*B = Bundle
C = Cluster
F = Fiber
M = Matrix

NFD = No fibers detected
N = No diffraction obtained

b. Check that the microscope is properly aligned and calibrated according to the manufacturer's specifications and instructions.

c. Microscope settings: 80–120 kV, grid assessment 250–1000X, then 15,000–20,000X screen magnification for analysis.

d. Approximately one-half (0.5) of the predetermined sample area to be analyzed shall be performed on one sample grid preparation and the remaining half on a second sample grid preparation.

e. Determine the suitability of the grid.

i. Individual grid openings with greater than 5 percent openings (holes) or covered with greater than 25 percent particulate matter or obviously having nonuniform loading shall not be analyzed.

ii. Examine the grid at low magnification (<1000X) to determine its suitability for detailed study at higher magnifications.

iii. Reject the grid if:

(1) Less than 50 percent of the grid openings covered by the replica are intact.

(2) It is doubled or folded.

(3) It is too dark because of incomplete dissolution of the filter.

iv. If the grid is rejected, load the next sample grid.

v. If the grid is acceptable, continue on to Step 6 if mapping is to be used; otherwise proceed to Step 7.

f. Grid Map (Optional).

i. Set the TEM to the low magnification mode.

ii. Use flat edge or finder grids for mapping.

iii. Index the grid openings (fields) to be counted by marking the acceptable fields for one-half (0.5) of the area needed for analysis on each of the two grids to be analyzed. These may be marked just before examining each grid opening (field), if desired.

iv. Draw in any details which will allow the grid to be properly oriented if it is reloaded into the microscope and a particular field is to be reliably identified.

g. Scan the grid.

i. Select a field to start the examination.

ii. Choose the appropriate magnification (15,000 to 20,000X screen magnification).

iii. Scan the grid as follows.

(1) At the selected magnification, make a series of parallel traverses across the field. On reaching the end of one traverse, move the image one window and reverse the traverse.

NOTE: A slight overlap should be used so as not to miss any part of the grid opening (field).

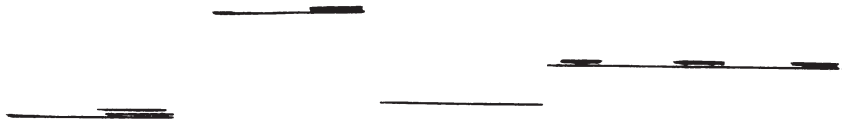
(2) Make parallel traverses until the entire grid opening (field) has been scanned.

h. Identify each structure for appearance and size.

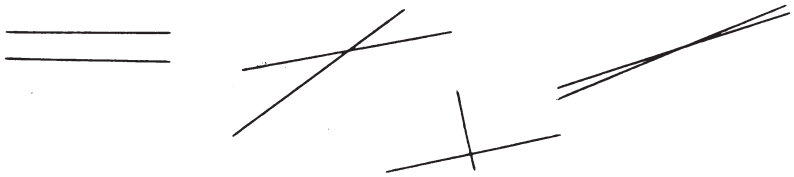
i. Appearance and size: Any continuous grouping of particles in which an asbestos fiber within aspect ratio greater than or equal to 5:1 and a length greater than or equal to 0.5 μm is detected shall be recorded on the count sheet. These will be designated asbestos structures and will be classified as fibers, bundles, clusters, or matrices. Record as individual fibers any contiguous grouping having 0, 1, or 2 definable intersections. Groupings having more than 2 intersections are to be described as cluster or matrix. See the following Figure 5:

FIGURE 5--COUNTING GUIDELINES USED IN DETERMINING ASBESTOS STRUCTURES

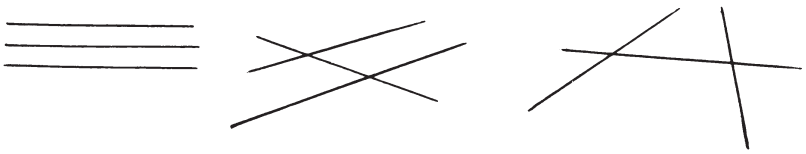
Count as 1 fiber; 1 Structure; no intersections.



Count as 2 fibers if space between fibers is greater than width of 1 fiber diameter or number of intersections is equal to or less than 1.

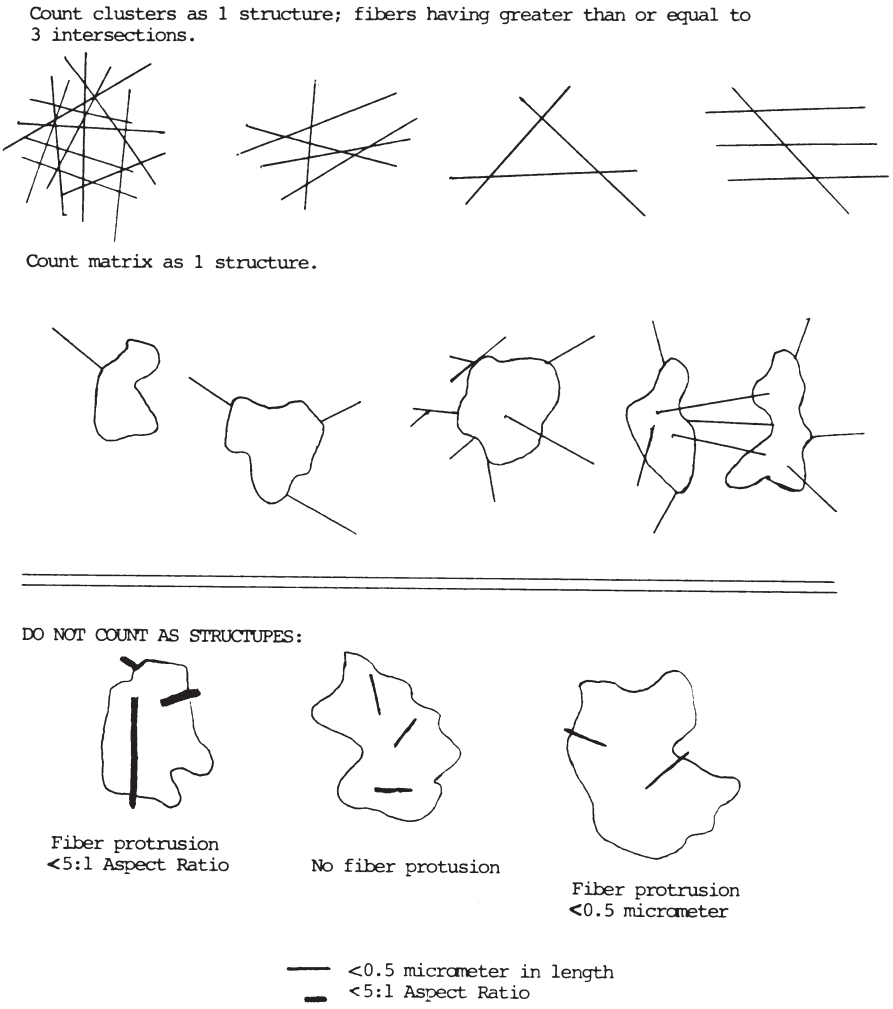


Count as 3 structures if space between fibers is greater than width of 1 fiber diameter or if the number of intersections is equal to or less than 2.



Count bundles as 1 structure; 3 or more parallel fibrils less than 1 fiber diameter separation.





An intersection is a non-parallel touching or crossing of fibers, with the projection having an aspect ratio of 5:1 or greater. Combinations such as a matrix and cluster, matrix and bundle, or bundle and cluster are categorized by the dominant fiber quality—cluster, bundle, and matrix, respectively. Separate categories will be maintained for fibers less than 5 μm and for fibers greater than or equal to 5 μm in length. Not required, but useful, may be to record the fiber length in 1 μm intervals. (Identify each structure morphologically and analyze it as it enters the ''window''.)

(1) *Fiber.* A structure having a minimum length greater than 0.5 μm and an aspect ratio (length to width) of 5:1 or greater and substantially parallel sides. Note the appearance of the end of the fiber, i.e., whether it is flat, rounded or dovetailed, no intersections.

(2) *Bundle.* A structure composed of 3 or more fibers in a parallel arrangement with each fiber closer than one fiber diameter.

(3) *Cluster.* A structure with fibers in a random arrangement such that all fibers are intermixed and no single fiber is isolated from the group; groupings must have more than 2 intersections.

(4) *Matrix*. Fiber or fibers with one end free and the other end embedded in or hidden by a particulate. The exposed fiber must meet the fiber definition.

(5) *NSD*. Record NSD when no structures are detected in the field.

(6) *Intersection*. Non-parallel touching or crossing of fibers, with the projection having an aspect ratio 5:1 or greater.

ii. Structure Measurement.

(1) Recognize the structure that is to be sized.

(2) Memorize its location in the ''window'' relative to the sides, inscribed square and to other particulates in the field so this exact location can be found again when scanning is resumed.

(3) Measure the structure using the scale on the screen.

(4) Record the length category and structure type classification on the count sheet after the field number and fiber number.

(5) Return the fiber to its original location in the window and scan the rest of the field for other fibers; if the direction of travel is not remembered, return to the right side of the field and begin the traverse again.

i. Visual identification of Electron Diffraction (ED) patterns is required for each asbestos structure counted which would cause the analysis to exceed the 70 s/mm^2 concentration. (Generally this means the first four fibers identified as asbestos must exhibit an identifiable diffraction pattern for chrysotile or amphibole.)

i. Center the structure, focus, and obtain an ED pattern. (See Microscope Instruction Manual for more detailed instructions.)

ii. From a visual examination of the ED pattern, obtained with a short camera length, classify the observed structure as belonging to one of the following classifications: chrysotile, amphibole, or nonasbestos.

(1) Chrysotile: The chrysotile asbestos pattern has characteristic streaks on the layer lines other than the central line and some streaking also on the central line. There will be spots of normal sharpness on the central layer line and on alternate lines (2nd, 4th, etc.). The repeat distance between layer lines is 0.53 nm and the center doublet is at 0.73 nm. The pattern should display (002), (110), (130) diffraction maxima; distances and geometry should match a chrysotile pattern and be measured semiquantitatively.

(2) Amphibole Group [includes grunerite (amosite), crocidolite, anthophyllite, tremolite, and actinolite]: Amphibole asbestos fiber patterns show layer lines formed by very closely spaced dots, and the repeat distance between layer lines is also about 0.53 nm. Streaking in layer lines is occasionally present due to crystal structure defects.

(3) Nonasbestos: Incomplete or unobtainable ED patterns, a nonasbestos EDXA, or a nonasbestos morphology.

iii. The micrograph number of the recorded diffraction patterns must be reported to the client and maintained in the laboratory's quality assurance records. The records must also demonstrate that the identification of the pattern has been verified by a qualified individual and that the operator who made the identification is maintaining at least an 80 percent correct visual identification based on his measured patterns. In the event that examination of the pattern by the qualified individual indicates that the pattern had been misidentified visually, the client shall be contacted. If the pattern is a suspected chrysotile, take a photograph of the diffraction pattern at 0 degrees tilt. If the structure is suspected to be amphibole, the sample may have to be tilted to obtain a simple geometric array of spots.

j. Energy Dispersive X-Ray Analysis (EDXA).

i. Required of all amphiboles which would cause the analysis results to exceed the 70 s/mm^2 concentration. (Generally speaking, the first 4 amphiboles would require EDXA.)

ii. Can be used alone to confirm chrysotile after the 70 s/mm^2 concentration has been exceeded.

iii. Can be used alone to confirm all nonasbestos.

iv. Compare spectrum profiles with profiles obtained from asbestos standards. The closest match identifies and categorizes the structure.

v. If the EDXA is used for confirmation, record the properly labeled spectrum on a computer disk, or if a hard copy, file with analysis data.

vi. If the number of fibers in the nonasbestos class would cause the analysis to exceed the 70 s/mm^2 concentration, their identities must be confirmed by EDXA or measurement of a zone axis diffraction pattern to establish that the particles are nonasbestos.

k. Stopping Rules.

i. If more than 50 asbestiform structures are counted in a particular grid opening, the analysis may be terminated.

ii. After having counted 50 asbestiform structures in a minimum of 4 grid openings, the analysis may be terminated. The grid opening in which the 50th fiber was counted must be completed.

iii. For blank samples, the analysis is always continued until 10 grid openings have been analyzed.

iv. In all other samples the analysis shall be continued until an analytical sensitivity of 0.005 s/cm^3 is reached.

l. Recording Rules. The count sheet should contain the following information:

i. Field (grid opening): List field number.

ii. Record ''NSD'' if no structures are detected.

iii. Structure information.

(1) If fibers, bundles, clusters, and/or matrices are found, list them in consecutive numerical order, starting over with each field.

(2) Length. Record length category of asbestos fibers examined. Indicate if less than 5 μm or greater than or equal to 5 μm.

(3) Structure Type. Positive identification of asbestos fibers is required by the method. At least one diffraction pattern of each fiber type from every five samples must be recorded and compared with a standard diffraction pattern. For each asbestos fiber reported, both a morphological descriptor and an identification descriptor shall be specified on the count sheet.

(4) Fibers classified as chrysotile must be identified by diffraction and/or X-ray analysis and recorded on the count sheet. X-ray analysis alone can be used as sole identification only after 70s/mm^2 have been exceeded for a particular sample.

(5) Fibers classified as amphiboles must be identified by X-ray analysis and electron diffraction and recorded on the count sheet. (X-ray analysis alone can be used as sole identification only after 70s/mm^2 have been exceeded for a particular sample.)

(6) If a diffraction pattern was recorded on film, the micrograph number must be indicated on the count sheet.

(7) If an electron diffraction was attempted and an appropriate spectra is not observed, N should be recorded on the count sheet.

(8) If an X-ray analysis is attempted but not observed, N should be recorded on the count sheet.

(9) If an X-ray analysis spectrum is stored, the file and disk number must be recorded on the count sheet.

m. Classification Rules.

i. *Fiber*. A structure having a minimum length greater than or equal to 0.5 μm and an aspect ratio (length to width) of 5:1 or greater and substantially parallel sides. Note the appearance of the end of the fiber, i.e., whether it is flat, rounded or dovetailed.

ii. *Bundle*. A structure composed of three or more fibers in a parallel arrangement with each fiber closer than one fiber diameter.

iii. *Cluster*. A structure with fibers in a random arrangement such that all fibers are intermixed and no single fiber is isolated from the group. Groupings must have more than two intersections.

iv. *Matrix*. Fiber or fibers with one end free and the other end embedded in or hidden by a particulate. The exposed fiber must meet the fiber definition.

v. *NSD*. Record NSD when no structures are detected in the field.

n. After all necessary analyses of a particle structure have been completed, return the goniometer stage to 0 degrees, and return the structure to its original location by recall of the original location.

o. Continue scanning until all the structures are identified, classified and sized in the field.

p. Select additional fields (grid openings) at low magnification; scan at a chosen magnification (15,000 to 20,000X screen magnification); and analyze until the stopping rule becomes applicable.

q. Carefully record all data as they are being collected, and check for accuracy.

r. After finishing with a grid, remove it from the microscope, and replace it in the appropriate grid hold. Sample grids must be stored for a minimum of 1 year from the date of the analysis; the sample cassette must be retained for a minimum of 30 days by the laboratory or returned at the client's request.

H. Sample Analytical Sequence

1. Carry out visual inspection of work site prior to air monitoring.

2. Collect a minimum of five air samples inside the work site and five samples outside the work site. The indoor and outdoor samples shall be taken during the same time period.

3. Analyze the abatement area samples according to this protocol. The analysis must meet the 0.005 s/cm^3 analytical sensitivity.

4. Remaining steps in the analytical sequence are contained in Unit IV. of this Appendix.

I. Reporting

The following information must be reported to the client. See the following Table II:

TABLE II--EXAMPLE LABORATORY LETTERHEAD

Laboratory I.D.	Client I.D.	FILTER MEDIA DATA				Analyzed Area, mm^2	Sample Volume, cc
		Type	Diameter, mm	Effective Area, mm^2	Pore Size, µm		

INDIVIDUAL ANALYTICAL RESULTS

Laboratory I.D.	Client I.D.	# Asbestos Structures	Analytical Sensitivity, s/cc	CONCENTRATION	
				Structures/mm^2	Structures/cc

The analysis was carried out to the approved TEM method. This laboratory is in compliance with the quality specified by the method.

Authorized Signature

1. Concentration in structures per square millimeter and structures per cubic centimeter.
2. Analytical sensitivity used for the analysis.
3. Number of asbestos structures.
4. Area analyzed.
5. Volume of air samples (which was initially provided by client).
6. Average grid size opening.
7. Number of grids analyzed.
8. Copy of the count sheet must be included with the report.

9. Signature of laboratory official to indicate that the laboratory met specifications of the AHERA method.

10. Report form must contain official laboratory identification (e.g., letterhead).

11. Type of asbestos.

J. Calibration Methodology

NOTE: Appropriate implementation of the method requires a person knowledgeable in electron diffraction and mineral identification by ED and EDXA. Those inexperienced laboratories wishing to develop capabilities may acquire necessary knowledge through analysis of appropriate standards and by following detailed methods as described in References 8 and 10 of Unit III.L.

1. *Equipment Calibration.* In this method, calibration is required for the air-sampling equipment and the transmission electron microscope (TEM).

a. *TEM Magnification.* The magnification at the fluorescent screen of the TEM must be calibrated at the grid opening magnification (if used) and also at the magnification used for fiber counting. This is performed with a cross grating replica. A logbook must be maintained, and the dates of calibration depend on the past history of the particular microscope; no frequency is specified. After any maintenance of the microscope that involved adjustment of the power supplied to the lenses or the high-voltage system or the mechanical disassembly of the electron optical column apart from filament exchange, the magnification must be recalibrated. Before the TEM calibration is performed, the analyst must ensure that the cross grating replica is placed at the same distance from the objective lens as the specimens are. For instruments that incorporate an eucentric tilting specimen stage, all speciments and the cross grating replica must be placed at the eucentric position.

b. Determination of the TEM magnification on the fluorescent screen.

i. Define a field of view on the fluorescent screen either by markings or physical boundaries. The field of view must be measurable or previously inscribed with a scale or concentric circles (all scales should be metric).

ii. Insert a diffraction grating replica (for example a grating containing 2,160 lines/mm) into the specimen holder and place into the microscope. Orient the replica so that the grating lines fall perpendicular to the scale on the TEM fluorescent screen. Ensure that the goniometer stage tilt is 0 degrees.

iii. Adjust microscope magnification to 10,000X or 20,000X. Measure the distance (mm) between two widely separated lines on the grating replica. Note the number of spaces between the lines. Take care to measure between the same relative positions on the lines (e.g., between left edges of lines).

NOTE: The more spaces included in the measurement, the more accurate the final calculation. On most microscopes, however, the magnification is substantially constant only within the central 8–10 cm diameter region of the fluorescent screen.

iv. Calculate the true magnification (M) on the fluorescent screen:

$M=XG/Y$

where:

X=total distance (mm) between the designated grating lines;

G=calibration constant of the grating replica (lines/mm):

Y=number of grating replica spaces counted along X.

c. Calibration of the EDXA System. Initially, the EDXA system must be calibrated by using two reference elements to calibrate the energy scale of the instrument. When this has been completed in accordance with the manufacturer's instructions, calibration in terms of the different types of asbestos can proceed. The EDXA detectors vary in both solid angle of detection and in window thickness. Therefore, at a particular accelerating voltage in use on the TEM, the count rate obtained from specific dimensions of fiber will vary both in absolute X-ray count rate and in the relative X-ray peak heights for different elements. Only a few minerals are relevant for asbestos abatement work, and in this procedure the calibration is specified in terms of a ''fingerprint'' technique. The EDXA spectra must be recorded from individual fibers of the relevant minerals, and identifications are made on the basis of semiquantitative comparisons with these reference spectra.

d. Calibration of Grid Openings.

i. Measure 20 grid openings on each of 20 random 200-mesh copper grids by placing a grid on a glass slide and examining it under the PCM. Use a calibrated graticule to measure the average field diameter and use this number to calculate the field area for an average grid opening. Grids are to be randomly selected from batches up to 1,000.

NOTE: A grid opening is considered as one field.

ii. The mean grid opening area must be measured for the type of specimen grids in use. This can be accomplished on the TEM at a properly calibrated low magnification or on an optical microscope at a magnification of approximately 400X by using an eyepiece fitted with a scale that has been calibrated against a stage micrometer. Optical microscopy utilizing manual or automated procedures may be used providing instrument calibration can be verified.

e. Determination of Camera Constant and ED Pattern Analysis.

i. The camera length of the TEM in ED operating mode must be calibrated before ED patterns on unknown samples are observed. This can be achieved by using a carbon-coated grid on which a thin film of gold has been

sputtered or evaporated. A thin film of gold is evaporated on the specimen TEM grid to obtain zone-axis ED patterns superimposed with a ring pattern from the polycrystalline gold film.

ii. In practice, it is desirable to optimize the thickness of the gold film so that only one or two sharp rings are obtained on the superimposed ED pattern. Thicker gold film would normally give multiple gold rings, but it will tend to mask weaker diffraction spots from the unknown fibrous particulates. Since the unknown d-spacings of most interest in asbestos analysis are those which lie closest to the transmitted beam, multiple gold rings are unnecessary on zone-axis ED patterns. An average camera constant using multiple gold rings can be determined. The camera constant is one-half the diameter, D, of the rings times the interplanar spacing, d, of the ring being measured.

K. Quality Control/Quality Assurance Procedures (Data Quality Indicators)

Monitoring the environment for airborne asbestos requires the use of sensitive sampling and analysis procedures. Because the test is sensitive, it may be influenced by a variety of factors. These include the supplies used in the sampling operation, the performance of the sampling, the preparation of the grid from the filter and the actual examination of this grid in the microscope. Each of these unit operations must produce a product of defined quality if the analytical result is to be a reliable and meaningful test result. Accordingly, a series of control checks and reference standards is performed along with the sample analysis as indicators that the materials used are adequate and the operations are within acceptable limits. In this way, the quality of the data is defined and the results are of known value. These checks and tests also provide timely and specific warning of any problems which might develop within the sampling and analysis operations. A description of these quality control/quality assurance procedures is summarized in the following Table III:

TABLE III--SUMMARY OF LABORATORY DATA QUALITY OBJECTIVES

Unit Operation	QC Check	Frequency	Conformance Expectation
Sample receiving	Review of receiving report	Each sample	95% complete
Sample custody	Review of chain-of-custody record	Each sample	95% complete
Sample preparation	Supplies and reagents	On receipt	Meet specs. or reject
	Grid opening size	20 openings/20 grids/lot of 1000 or 1 opening/sample	100%
	Special clean area monitoring	After cleaning or service	Meet specs or reclean
	Laboratory blank	1 per prep series or 10%	Meet specs. or reanalyze series
	Plasma etch blank	1 per 20 samples	75%
	Multiple preps (3 per sample)	Each sample	One with cover of 15 complete grid sqs.
Sample analysis	System check	Each day	Each day
	Alignment check	Each day	Each day
	Magnification calibration with low and high standards	Each month or after service	95%
	ED calibration by gold standard	Weekly	95%
	EDS calibration by copper line	Daily	95%
Performance check	Laboratory blank (measure of cleanliness)	Prep 1 per series or 10% read 1 per 25 samples	Meet specs or reanalyze series
	Replicate counting (measure of precision)	1 per 100 samples	1.5 x Poisson Std. Dev.
	Duplicate analysis (measure of reproducibility)	1 per 100 samples	2 x Poisson Std. Dev.
	Known samples of typical materials (working standards)	Training and for comparison with unknowns	100%
	Analysis of NBS SRM 1876 and/or RM 8410 (measure of accuracy and comparability)	1 per analyst per year	1.5 x Poisson Std. Dev.
	Data entry review (data validation and measure of completeness)	Each sample	95%
	Record and verify ID electron diffraction pattern of structure	1 per 5 samples	80% accuracy
Calculations and data reduction	Hand calculation of automated data reduction procedure or independent recalculation of hand-calculated data	1 per 100 samples	85%

1. When the samples arrive at the laboratory, check the samples and documentation for completeness and requirements before initiating the analysis.

2. Check all laboratory reagents and supplies for acceptable asbestos background levels.

3. Conduct all sample preparation in a clean room environment monitored by laboratory blanks and special testing after cleaning or servicing the room.

4. Prepare multiple grids of each sample.

5. Provide laboratory blanks with each sample batch. Maintain a cumulative average of these results. If this average is greater than 53 f/mm^2 per 10 200-mesh grid openings, check the system for possible sources of contamination.

6. Check for recovery of asbestos from cellulose ester filters submitted to plasma asher.

7. Check for asbestos carryover in the plasma asher by including a blank alongside the positive control sample.

8. Perform a systems check on the transmission electron microscope daily.

9. Make periodic performance checks of magnification, electron diffraction and energy dispersive X-ray systems as set forth in Table III of Unit III.K.

10. Ensure qualified operator performance by evaluation of replicate counting, duplicate analysis, and standard sample comparisons as set forth in Table III of Unit III.K.

11. Validate all data entries.

12. Recalculate a percentage of all computations and automatic data reduction steps as specified in Table III.

13. Record an electron diffraction pattern of one asbestos structure from every five samples that contain asbestos. Verify the identification of the pattern by measurement or comparison of the pattern with patterns collected from standards under the same conditions.

The outline of quality control procedures presented above is viewed as the minimum required to assure that quality data is produced for clearance testing of an asbestos abated area. Additional information may be gained by other control tests. Specifics on those control procedures and options available for environmental testing can be obtained by consulting References 6, 7, and 11 of Unit III.L.

L. References

For additional background information on this method the following references should be consulted.

1. ''Guidelines for Controlling Asbestos-Containing Materials in Buildings,'' EPA 560/5–85–024, June 1985.

2. ''Measuring Airborne Asbestos Following an Abatement Action,'' USEP/Office of Pollution Prevention and Toxics, EPA 600/4–85–049, 1985.

3. Small, John and E. Steel. Asbestos Standards: Materials and Analytical Methods. N.B.S. Special Publication 619, 1982.

4. Campbell, W.J., R.L. Blake, L.L. Brown, E.E. Cather, and J.J. Sjoberg. Selected Silicate Minerals and Their Asbestiform Varieties. Information Circular 8751, U.S. Bureau of Mines, 1977.

5. Quality Assurance Handbook for Air Pollution Measurement System. Ambient Air Methods, EPA 600/4–77–027a, USEPA, Office of Research and Development, 1977.

6. Method 2A: Direct Measurement of Gas Volume Through Pipes and Small Ducts. 40 CFR Part 60 Appendix A.

7. Burdette, G.J. Health & Safety Exec., Research & Lab. Services Div., London, ''Proposed Analytical Method for Determination of Asbestos in Air.''

8. Chatfield, E.J., Chatfield Tech. Cons., Ltd., Clark, T., PEI Assoc. ''Standard Operating Procedure for Determination of Airborne Asbestos Fibers by Transmission Electron Microscopy Using Polycarbonate Membrane Filters.'' WERL SOP 87–1, March 5, 1987.

9. NIOSH. Method 7402 for Asbestos Fibers, December 11, 1986 Draft.

10. Yamate, G., S.C. Agarwall, R.D. Gibbons, IIT Research Institute, ''Methodology for the Measurement of Airborne Asbestos by Electron Microscopy.'' Draft report, USEPA Contract 68–02–3266, July 1984.

11. Guidance to the Preparation of Quality Assurance Project Plans. USEPA, Office of Pollution Prevention and Toxics, 1984.

IV. Mandatory Interpretation of Transmission Electron Microscopy Results To Determine Completion of Response Actions

A. Introduction

A response action is determined to be completed by TEM when the abatement area has been cleaned and the airborne asbestos concentration inside the abatement area is no higher than concentrations at locations outside the abatement area. ''Outside'' means outside the abatement area, but not necessarily outside the building. EPA reasons that an asbestos removal contractor cannot be expected to clean an abatement area to an airborne asbestos concentration that is lower than the concentration of air entering the abatement area from outdoors or from other parts of the building. After the abatement area has passed a thorough visual inspection, and before the outer containment barrier is removed, a minimum of five air samples inside the abatement area and a minimum of five air samples outside the abatement area must be collected. Hence, the response action is determined to be completed when the average airborne asbestos concentration measured inside the abatement area is not statistically different from the average airborne asbestos concentration measured outside the abatement area.

The inside and outside concentrations are compared by the Z-test, a statistical test that takes into account the variability in the measurement process. A minimum of five samples inside the abatement area and five samples outside the abatement area are required to control the false negative error rate, i.e., the probability of declaring the removal complete when, in fact, the air concentration inside the abatement area is significantly higher than outside the abatement area. Additional quality control is provided by requiring three blanks (filters through which no air has been drawn) to be analyzed to check for unusually high filter contamination that would distort the test results.

When volumes greater than or equal to 1,199 L for a 25 mm filter and 2,799 L for a 37 mm filter have been collected and the average number of asbestos structures on samples inside the abatement area is no greater than 70 s/mm^2 of filter, the response action

may be considered complete without comparing the inside samples to the outside samples. EPA is permitting this initial screening test to save analysis costs in situations where the airborne asbestos concentration is sufficiently low so that it cannot be distinguished from the filter contamination/background level (fibers deposited on the filter that are unrelated to the air being sampled). The screening test cannot be used when volumes of less than 1,199 L for 25 mm filter or 2,799 L for a 37 mm filter are collected because the ability to distinguish levels significantly different from filter background is reduced at low volumes.

The initial screening test is expressed in structures per square millimeter of filter because filter background levels come from sources other than the air being sampled and cannot be meaningfully expressed as a concentration per cubic centimeter of air. The value of 70 s/mm^2 is based on the experience of the panel of microscopists who consider one structure in 10 grid openings (each grid opening with an area of 0.0057 mm^2) to be comparable with contamination/background levels of blank filters. The decision is based, in part, on Poisson statistics which indicate that four structures must be counted on a filter before the fiber count is statistically distinguishable from the count for one structure. As more information on the performance of the method is collected, this criterion may be modified. Since different combinations of the number and size of grid openings are permitted under the TEM protocol, the criterion is expressed in structures per square millimeter of filter to be consistent across all combinations. Four structures per 10 grid openings corresponds to approximately 70 s/mm^2.

B. Sample Collection and Analysis

1. A minimum of 13 samples is required: five samples collected inside the abatement area, five samples collected outside the abatement area, two field blanks, and one sealed blank.

2. Sampling and TEM analysis must be done according to either the mandatory or nonmandatory protocols in Appendix A. At least 0.057 mm^2 of filter must be examined on blank filters.

C. Interpretation of Results

1. The response action shall be considered complete if either:

a. Each sample collected inside the abatement area consists of at least 1,199 L of air for a 25 mm filter, or 2,799 L of air for a 37 mm filter, and the arithmetic mean of their asbestos structure concentrations per square millimeter of filter is less than or equal to 70 s/mm^2; or

b. The three blank samples have an arithmetic mean of the asbestos structure concentration on the blank filters that is less than or equal to 70 s/mm^2 and the average airborne asbestos concentration measured inside the abatement area is not statistically higher than the average airborne asbestos concentration measured outside the abatement area as determined by the Z-test. The Z-test is carried out by calculating

$$Z = \frac{\bar{Y}_I - \bar{Y}_O}{0.8\left(1/n_I + 1/n_O\right)^{1/2}}$$

where Y_I is the average of the natural logarithms of the inside samples and Y_O is the average of the natural logarithms of the outside samples, n_I is the number of inside samples and n_O is the number of outside samples. The response action is considered complete if Z is less than or equal to 1.65.

NOTE: When no fibers are counted, the calculated detection limit for that analysis is inserted for the concentration.

2. If the abatement site does not satisfy either (1) or (2) of this Section C, the site must be recleaned and a new set of samples collected.

D. Sequence for Analyzing Samples

It is possible to determine completion of the response action without analyzing all samples. Also, at any point in the process, a decision may be made to terminate the analysis of existing samples, reclean the abatement site, and collect a new set of samples. The following sequence is outlined to minimize the number of analyses needed to reach a decision.

1. Analyze the inside samples.

2. If at least 1,199 L of air for a 25 mm filter or 2,799 L of air for a 37 mm filter is collected for each inside sample and the arithmetic mean concentration of structures per square millimeter of filter is less than or equal to 70 s/mm^2, the response action is complete and no further analysis is needed.

3. If less than 1,199 L of air for a 25 mm filter or 2,799 L of air for a 37 mm filter is collected for any of the inside samples, or the arithmetic mean concentration of structures per square millimeter of filter is greater than 70 s/mm^2, analyze the three blanks.

4. If the arithmetic mean concentration of structures per square millimeter on the blank filters is greater than 70 s/mm^2, terminate the analysis, identify and correct the source of blank contamination, and collect a new set of samples.

5. If the arithmetic mean concentration of structures per square millimeter on the blank filters is less than or equal to 70 s/mm^2, analyze the outside samples and perform the Z-test.

6. If the Z-statistic is less than or equal to 1.65, the response action is complete. If the Z-statistic is greater than 1.65, reclean the abatement site and collect a new set of samples.

[52 FR 41857, Oct. 30, 1987]

APPENDIX B TO SUBPART E OF PART 763 [RESERVED]

APPENDIX C TO SUBPART E OF PART 763—ASBESTOS MODEL ACCREDITATION PLAN

I. Asbestos Model Accreditation Plan for States

The Asbestos Model Accreditation Plan (MAP) for States has eight components:

(A) Definitions
(B) Initial Training
(C) Examinations
(D) Continuing Education
(E) Qualifications
(F) Recordkeeping Requirements for Training Providers
(G) Deaccreditation
(H) Reciprocity
(I) Electronic reporting

A. Definitions

For purposes of Appendix C:

1. ''Friable asbestos-containing material (ACM)'' means any material containing more than one percent asbestos which has been applied on ceilings, walls, structural members, piping, duct work, or any other part of a building, which when dry, may be crumbled, pulverized, or reduced to powder by hand pressure. The term includes non-friable asbestos-containing material after such previously non-friable material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

2. ''Friable asbestos-containing building material (ACBM)'' means any friable ACM that is in or on interior structural members or other parts of a school or public and commercial building.

3. ''Inspection'' means an activity undertaken in a school building, or a public and commercial building, to determine the presence or location, or to assess the condition of, friable or non-friable asbestos-containing building material (ACBM) or suspected ACBM, whether by visual or physical examination, or by collecting samples of such material. This term includes reinspections of friable and non-friable known or assumed ACBM which has been previously identified. The term does not include the following:

a. Periodic surveillance of the type described in 40 CFR 763.92(b) solely for the purpose of recording or reporting a change in the condition of known or assumed ACBM;

b. Inspections performed by employees or agents of Federal, State, or local government solely for the purpose of determining compliance with applicable statutes or regulations; or

c. visual inspections of the type described in 40 CFR 763.90(i) solely for the purpose of determining completion of response actions.

4. ''Major fiber release episode'' means any uncontrolled or unintentional disturbance of ACBM, resulting in a visible emission, which involves the falling or dislodging of more than 3 square or linear feet of friable ACBM.

5. ''Minor fiber release episode'' means any uncontrolled or unintentional disturbance of ACBM, resulting in a visible emission, which involves the falling or dislodging of 3 square or linear feet or less of friable ACBM.

6. ''Public and commercial building'' means the interior space of any building which is not a school building, except that the term does not include any residential apartment building of fewer than 10 units or detached single-family homes. The term includes, but is not limited to: industrial and office buildings, residential apartment buildings and condominiums of 10 or more dwelling units, government-owned buildings, colleges, museums, airports, hospitals, churches, preschools, stores, warehouses and factories. Interior space includes exterior hallways connecting buildings, porticos, and mechanical systems used to condition interior space.

7. ''Response action'' means a method, including removal, encapsulation, enclosure, repair, and operation and maintenance, that protects human health and the environment from friable ACBM.

8. ''Small-scale, short-duration activities (SSSD)'' are tasks such as, but not limited to:

a. Removal of asbestos-containing insulation on pipes.

b. Removal of small quantities of asbestos-containing insulation on beams or above ceilings.

c. Replacement of an asbestos-containing gasket on a valve.

d. Installation or removal of a small section of drywall.

e. Installation of electrical conduits through or proximate to asbestos-containing materials.

SSSD can be further defined by the following considerations:

f. Removal of small quantities of ACM only if required in the performance of another maintenance activity not intended as asbestos abatement.

g. Removal of asbestos-containing thermal system insulation not to exceed amounts greater than those which can be contained in a single glove bag.

h. Minor repairs to damaged thermal system insulation which do not require removal.

i. Repairs to a piece of asbestos-containing wallboard.

j. Repairs, involving encapsulation, enclosure, or removal, to small amounts of friable ACM only if required in the performance of emergency or routine maintenance activity and not intended solely as asbestos abatement. Such work may not exceed amounts greater than those which can be contained in a single prefabricated mini-enclosure. Such an enclosure shall conform spatially and geometrically to the localized work area, in order to perform its intended containment function.

B. Initial Training

Training requirements for purposes of accreditation are specified both in terms of required subjects of instruction and in terms of length of training. Each initial training course has a prescribed curriculum and number of days of training. One day of training equals 8 hours, including breaks and lunch. Course instruction must be provided by EPA or State-approved instructors. EPA or State instructor approval shall be based upon a review of the instructor's academic credentials and/or field experience in asbestos abatement.

Beyond the initial training requirements, individual States may wish to consider requiring additional days of training for purposes of supplementing hands-on activities or for reviewing relevant state regulations. States also may wish to consider the relative merits of a worker apprenticeship program. Further, they might consider more stringent minimum qualification standards for the approval of training instructors. EPA recommends that the enrollment in any given course be limited to 25 students so that adequate opportunities exist for individual hands-on experience.

States have the option to provide initial training directly or approve other entities to offer training. The following requirements are for the initial training of persons required to have accreditation under TSCA Title II.

Training requirements for each of the five accredited disciplines are outlined below. Persons in each discipline perform a different job function and distinct role. Inspectors identify and assess the condition of ACBM, or suspect ACBM. Management planners use data gathered by inspectors to assess the degree of hazard posed by ACBM in schools to determine the scope and timing of appropriate response actions needed for schools. Project designers determine how asbestos abatement work should be conducted. Lastly, workers and contractor/supervisors carry out and oversee abatement work. In addition, a recommended training curriculum is also presented for a sixth discipline, which is not federally-accredited, that of ''Project Monitor.'' Each accredited discipline and training curriculum is separate and distinct from the others. A person seeking accreditation in any of the five accredited MAP disciplines cannot attend two or more courses concurrently, but may attend such courses sequentially.

In several instances, initial training courses for a specific discipline (e.g., workers, inspectors) require hands-on training. For asbestos abatement contractor/supervisors and workers, hands-on training should include working with asbestos-substitute materials, fitting and using respirators, use of glovebags, donning protective clothing, and constructing a decontamination unit as well as other abatement work activities.

1. WORKERS

A person must be accredited as a worker to carry out any of the following activities with respect to friable ACBM in a school or public and commercial building: (1) A response action other than a SSSD activity, (2) a maintenance activity that disturbs friable ACBM other than a SSSD activity, or (3) a response action for a major fiber release episode. All persons seeking accreditation as asbestos abatement workers shall complete at least a 4–day training course as outlined below. The 4–day worker training course shall include lectures, demonstrations, at least 14 hours of hands-on training, individual respirator fit testing, course review, and an examination. Hands-on training must permit workers to have actual experience performing tasks associated with asbestos abatement. A person who is otherwise accredited as a contractor/supervisor may perform in the role of a worker without possessing separate accreditation as a worker.

Because of cultural diversity associated with the asbestos workforce, EPA recommends that States adopt specific standards for the approval of foreign language courses for abatement workers. EPA further recommends the use of audio-visual materials to complement lectures, where appropriate.

The training course shall adequately address the following topics:

(a) *Physical characteristics of asbestos.* Identification of asbestos, aerodynamic characteristics, typical uses, and physical appearance, and a summary of abatement control options.

(b) *Potential health effects related to asbestos exposure.* The nature of asbestos-related diseases; routes of exposure; dose-response relationships and the lack of a safe exposure level; the synergistic effect between cigarette smoking and asbestos exposure; the latency periods for asbestos-related diseases; a discussion of the relationship of asbestos exposure to asbestosis, lung cancer, mesothelioma, and cancers of other organs.

(c) *Employee personal protective equipment.* Classes and characteristics of respirator

types; limitations of respirators; proper selection, inspection; donning, use, maintenance, and storage procedures for respirators; methods for field testing of the facepiece-to-face seal (positive and negative-pressure fit checks); qualitative and quantitative fit testing procedures; variability between field and laboratory protection factors that alter respiratory fit (e.g., facial hair); the components of a proper respiratory protection program; selection and use of personal protective clothing; use, storage, and handling of non-disposable clothing; and regulations covering personal protective equipment.

(d) *State-of-the-art work practices.* Proper work practices for asbestos abatement activities, including descriptions of proper construction; maintenance of barriers and decontamination enclosure systems; positioning of warning signs; lock-out of electrical and ventilation systems; proper working techniques for minimizing fiber release; use of wet methods; use of negative pressure exhaust ventilation equipment; use of high-efficiency particulate air (HEPA) vacuums; proper clean-up and disposal procedures; work practices for removal, encapsulation, enclosure, and repair of ACM; emergency procedures for sudden releases; potential exposure situations; transport and disposal procedures; and recommended and prohibited work practices.

(e) *Personal hygiene.* Entry and exit procedures for the work area; use of showers; avoidance of eating, drinking, smoking, and chewing (gum or tobacco) in the work area; and potential exposures, such as family exposure.

(f) *Additional safety hazards.* Hazards encountered during abatement activities and how to deal with them, including electrical hazards, heat stress, air contaminants other than asbestos, fire and explosion hazards, scaffold and ladder hazards, slips, trips, and falls, and confined spaces.

(g) *Medical monitoring.* OSHA and EPA Worker Protection Rule requirements for physical examinations, including a pulmonary function test, chest X-rays, and a medical history for each employee.

(h) *Air monitoring.* Procedures to determine airborne concentrations of asbestos fibers, focusing on how personal air sampling is performed and the reasons for it.

(i) *Relevant Federal, State, and local regulatory requirements, procedures, and standards.* With particular attention directed at relevant EPA, OSHA, and State regulations concerning asbestos abatement workers.

(j) *Establishment of respiratory protection programs.*

(k) *Course review.* A review of key aspects of the training course.

2. CONTRACTOR/SUPERVISORS

A person must be accredited as a contractor/supervisor to supervise any of the following activities with respect to friable ACBM in a school or public and commercial building: (1) A response action other than a SSSD activity, (2) a maintenance activity that disturbs friable ACBM other than a SSSD activity, or (3) a response action for a major fiber release episode. All persons seeking accreditation as asbestos abatement contractor/supervisors shall complete at least a 5–day training course as outlined below. The training course must include lectures, demonstrations, at least 14 hours of hands-on training, individual respirator fit testing, course review, and a written examination. Hands-on training must permit supervisors to have actual experience performing tasks associated with asbestos abatement.

EPA recommends the use of audiovisual materials to complement lectures, where appropriate.

Asbestos abatement supervisors include those persons who provide supervision and direction to workers performing response actions. Supervisors may include those individuals with the position title of foreman, working foreman, or leadman pursuant to collective bargaining agreements. At least one supervisor is required to be at the worksite at all times while response actions are being conducted. Asbestos workers must have access to accredited supervisors throughout the duration of the project.

The contractor/supervisor training course shall adequately address the following topics:

(a) *The physical characteristics of asbestos and asbestos-containing materials.* Identification of asbestos, aerodynamic characteristics, typical uses, physical appearance, a review of hazard assessment considerations, and a summary of abatement control options.

(b) *Potential health effects related to asbestos exposure.* The nature of asbestos-related diseases; routes of exposure; dose-response relationships and the lack of a safe exposure level; synergism between cigarette smoking and asbestos exposure; and latency period for diseases.

(c) *Employee personal protective equipment.* Classes and characteristics of respirator types; limitations of respirators; proper selection, inspection, donning, use, maintenance, and storage procedures for respirators; methods for field testing of the facepiece-to-face seal (positive and negative-pressure fit checks); qualitative and quantitative fit testing procedures; variability between field and laboratory protection factors that alter respiratory fit (e.g., facial hair); the components of a proper respiratory protection program; selection and use of personal protective clothing; and use, storage,

and handling of non-disposable clothing; and regulations covering personal protective equipment.

(d) *State-of-the-art work practices.* Proper work practices for asbestos abatement activities, including descriptions of proper construction and maintenance of barriers and decontamination enclosure systems; positioning of warning signs; lock-out of electrical and ventilation systems; proper working techniques for minimizing fiber release; use of wet methods; use of negative pressure exhaust ventilation equipment; use of HEPA vacuums; and proper clean-up and disposal procedures. Work practices for removal, encapsulation, enclosure, and repair of ACM; emergency procedures for unplanned releases; potential exposure situations; transport and disposal procedures; and recommended and prohibited work practices. New abatement-related techniques and methodologies may be discussed.

(e) *Personal hygiene.* Entry and exit procedures for the work area; use of showers; and avoidance of eating, drinking, smoking, and chewing (gum or tobacco) in the work area. Potential exposures, such as family exposure, shall also be included.

(f) *Additional safety hazards.* Hazards encountered during abatement activities and how to deal with them, including electrical hazards, heat stress, air contaminants other than asbestos, fire and explosion hazards, scaffold and ladder hazards, slips, trips, and falls, and confined spaces.

(g) *Medical monitoring.* OSHA and EPA Worker Protection Rule requirements for physical examinations, including a pulmonary function test, chest X-rays and a medical history for each employee.

(h) *Air monitoring.* Procedures to determine airborne concentrations of asbestos fibers, including descriptions of aggressive air sampling, sampling equipment and methods, reasons for air monitoring, types of samples and interpretation of results.

EPA recommends that transmission electron microscopy (TEM) be used for analysis of final air clearance samples, and that sample analyses be performed by laboratories accredited by the National Institute of Standards and Technology's (NIST) National Voluntary Laboratory Accreditation Program (NVLAP).

(i) *Relevant Federal, State, and local regulatory requirements, procedures, and standards, including:*

(i) Requirements of TSCA Title II.

(ii) National Emission Standards for Hazardous Air Pollutants (40 CFR part 61), Subparts A (General Provisions) and M (National Emission Standard for Asbestos).

(iii) OSHA standards for permissible exposure to airborne concentrations of asbestos fibers and respiratory protection (29 CFR 1910.134).

(iv) OSHA Asbestos Construction Standard (29 CFR 1926.58). (v)EPA Worker Protection Rule, (40 CFR part 763, Subpart G).

(j) *Respiratory Protection Programs and Medical Monitoring Programs.*

(k) *Insurance and liability issues.* Contractor issues; worker's compensation coverage and exclusions; third-party liabilities and defenses; insurance coverage and exclusions.

(l) *Recordkeeping for asbestos abatement projects.* Records required by Federal, State, and local regulations; records recommended for legal and insurance purposes.

(m) *Supervisory techniques for asbestos abatement activities.* Supervisory practices to enforce and reinforce the required work practices and discourage unsafe work practices.

(n) *Contract specifications.* Discussions of key elements that are included in contract specifications.

(o) *Course review.* A review of key aspects of the training course.

3. INSPECTOR

All persons who inspect for ACBM in schools or public and commercial buildings must be accredited. All persons seeking accreditation as an inspector shall complete at least a 3–day training course as outlined below. The course shall include lectures, demonstrations, 4 hours of hands-on training, individual respirator fit-testing, course review, and a written examination.

EPA recommends the use of audiovisual materials to complement lectures, where appropriate. Hands-on training should include conducting a simulated building walk-through inspection and respirator fit testing. The inspector training course shall adequately address the following topics:

(a) *Background information on asbestos.* Identification of asbestos, and examples and discussion of the uses and locations of asbestos in buildings; physical appearance of asbestos.

(b) *Potential health effects related to asbestos exposure.* The nature of asbestos-related diseases; routes of exposure; dose-response relationships and the lack of a safe exposure level; the synergistic effect between cigarette smoking and asbestos exposure; the latency periods for asbestos-related diseases; a discussion of the relationship of asbestos exposure to asbestosis, lung cancer, mesothelioma, and cancers of other organs.

(c) *Functions/qualifications and role of inspectors.* Discussions of prior experience and qualifications for inspectors and management planners; discussions of the functions of an accredited inspector as compared to those of an accredited management planner; discussion of inspection process including inventory of ACM and physical assessment.

(d) *Legal liabilities and defenses.* Responsibilities of the inspector and management

planner; a discussion of comprehensive general liability policies, claims-made, and occurrence policies, environmental and pollution liability policy clauses; state liability insurance requirements; bonding and the relationship of insurance availability to bond availability.

(e) *Understanding building systems.* The interrelationship between building systems, including: an overview of common building physical plan layout; heat, ventilation, and air conditioning (HVAC) system types, physical organization, and where asbestos is found on HVAC components; building mechanical systems, their types and organization, and where to look for asbestos on such systems; inspecting electrical systems, including appropriate safety precautions; reading blueprints and as-built drawings.

(f) *Public/employee/building occupant relations.* Notifying employee organizations about the inspection; signs to warn building occupants; tact in dealing with occupants and the press; scheduling of inspections to minimize disruptions; and education of building occupants about actions being taken.

(g) *Pre-inspection planning and review of previous inspection records.* Scheduling the inspection and obtaining access; building record review; identification of probable homogeneous areas from blueprints or as-built drawings; consultation with maintenance or building personnel; review of previous inspection, sampling, and abatement records of a building; the role of the inspector in exclusions for previously performed inspections.

(h) *Inspecting for friable and non-friable ACM and assessing the condition of friable ACM.* Procedures to follow in conducting visual inspections for friable and non-friable ACM; types of building materials that may contain asbestos; touching materials to determine friability; open return air plenums and their importance in HVAC systems; assessing damage, significant damage, potential damage, and potential significant damage; amount of suspected ACM, both in total quantity and as a percentage of the total area; type of damage; accessibility; material's potential for disturbance; known or suspected causes of damage or significant damage; and deterioration as assessment factors.

(i) *Bulk sampling/documentation of asbestos.* Detailed discussion of the ''Simplified Sampling Scheme for Friable Surfacing Materials (EPA 560/5-85-030a October 1985)''; techniques to ensure sampling in a randomly distributed manner for other than friable surfacing materials; sampling of non-friable materials; techniques for bulk sampling; inspector's sampling and repair equipment; patching or repair of damage from sampling; discussion of polarized light microscopy; choosing an accredited laboratory to analyze bulk samples; quality control and quality assurance procedures. EPA's recommendation that all bulk samples collected from school or public and commercial buildings be analyzed by a laboratory accredited under the NVLAP administered by NIST.

(j) *Inspector respiratory protection and personal protective equipment.* Classes and characteristics of respirator types; limitations of respirators; proper selection, inspection; donning, use, maintenance, and storage procedures for respirators; methods for field testing of the facepiece-to-face seal (positive and negative-pressure fit checks); qualitative and quantitative fit testing procedures; variability between field and laboratory protection factors that alter respiratory fit (e.g., facial hair); the components of a proper respiratory protection program; selection and use of personal protective clothing; use, storage, and handling of non-disposable clothing.

(k) *Recordkeeping and writing the inspection report.* Labeling of samples and keying sample identification to sampling location; recommendations on sample labeling; detailing of ACM inventory; photographs of selected sampling areas and examples of ACM condition; information required for inclusion in the management plan required for school buildings under TSCA Title II, section 203 (i)(1). EPA recommends that States develop and require the use of standardized forms for recording the results of inspections in schools or public or commercial buildings, and that the use of these forms be incorporated into the curriculum of training conducted for accreditation.

(l) *Regulatory review.* The following topics should be covered: National Emission Standards for Hazardous Air Pollutants (NESHAP; 40 CFR part 61, Subparts A and M); EPA Worker Protection Rule (40 CFR part 763, Subpart G); OSHA Asbestos Construction Standard (29 CFR 1926.58); OSHA respirator requirements (29 CFR 1910.134); the Asbestos-Containing Materials in School Rule (40 CFR part 763, Subpart E; applicable State and local regulations, and differences between Federal and State requirements where they apply, and the effects, if any, on public and nonpublic schools or commercial or public buildings.

(m) *Field trip.* This includes a field exercise, including a walk-through inspection; on-site discussion about information gathering and the determination of sampling locations; on-site practice in physical assessment; classroom discussion of field exercise.

(n) *Course review.* A review of key aspects of the training course.

4. MANAGEMENT PLANNER

All persons who prepare management plans for schools must be accredited. All persons seeking accreditation as management planners shall complete a 3–day inspector training course as outlined above and a 2–day

management planner training course. Possession of current and valid inspector accreditation shall be a prerequisite for admission to the management planner training course. The management planner course shall include lectures, demonstrations, course review, and a written examination.

EPA recommends the use of audiovisual materials to complement lectures, where appropriate.

TSCA Title II does not require accreditation for persons performing the management planner role in public and commercial buildings. Nevertheless, such persons may find this training and accreditation helpful in preparing them to design or administer asbestos operations and maintenance programs for public and commercial buildings.

The management planner training course shall adequately address the following topics:

(a) *Course overview.* The role and responsibilities of the management planner; operations and maintenance programs; setting work priorities; protection of building occupants.

(b) *Evaluation/interpretation of survey results.* Review of TSCA Title II requirements for inspection and management plans for school buildings as given in section 203(i)(1) of TSCA Title II; interpretation of field data and laboratory results; comparison of field inspector's data sheet with laboratory results and site survey.

(c) *Hazard assessment.* Amplification of the difference between physical assessment and hazard assessment; the role of the management planner in hazard assessment; explanation of significant damage, damage, potential damage, and potential significant damage; use of a description (or decision tree) code for assessment of ACM; assessment of friable ACM; relationship of accessibility, vibration sources, use of adjoining space, and air plenums and other factors to hazard assessment.

(d) *Legal implications.* Liability; insurance issues specific to planners; liabilities associated with interim control measures, in-house maintenance, repair, and removal; use of results from previously performed inspections.

(e) *Evaluation and selection of control options.* Overview of encapsulation, enclosure, interim operations and maintenance, and removal; advantages and disadvantages of each method; response actions described via a decision tree or other appropriate method; work practices for each response action; staging and prioritizing of work in both vacant and occupied buildings; the need for containment barriers and decontamination in response actions.

(f) *Role of other professionals.* Use of industrial hygienists, engineers, and architects in developing technical specifications for response actions; any requirements that may exist for architect sign-off of plans; team approach to design of high-quality job specifications.

(g) *Developing an operations and maintenance (O&M) plan.* Purpose of the plan; discussion of applicable EPA guidance documents; what actions should be taken by custodial staff; proper cleaning procedures; steam cleaning and HEPA vacuuming; reducing disturbance of ACM; scheduling O&M for off-hours; rescheduling or canceling renovation in areas with ACM; boiler room maintenance; disposal of ACM; in-house procedures for ACM—bridging and penetrating encapsulants; pipe fittings; metal sleeves; polyvinyl chloride (PVC), canvas, and wet wraps; muslin with straps, fiber mesh cloth; mineral wool, and insulating cement; discussion of employee protection programs and staff training; case study in developing an O&M plan (development, implementation process, and problems that have been experienced).

(h) *Regulatory review.* Focusing on the OSHA Asbestos Construction Standard found at 29 CFR 1926.58; the National Emission Standard for Hazardous Air Pollutants (NESHAP) found at 40 CFR part 61, Subparts A (General Provisions) and M (National Emission Standard for Asbestos); EPA Worker Protection Rule found at 40 CFR part 763, Subpart G; TSCA Title II; applicable State regulations.

(i) *Recordkeeping for the management planner.* Use of field inspector's data sheet along with laboratory results; on-going recordkeeping as a means to track asbestos disturbance; procedures for recordkeeping. EPA recommends that States require the use of standardized forms for purposes of management plans and incorporate the use of such forms into the initial training course for management planners.

(j) *Assembling and submitting the management plan.* Plan requirements for schools in TSCA Title II section 203(i)(1); the management plan as a planning tool.

(k) *Financing abatement actions.* Economic analysis and cost estimates; development of cost estimates; present costs of abatement versus future operation and maintenance costs; Asbestos School Hazard Abatement Act grants and loans.

(l) *Course review.* A review of key aspects of the training course.

5. PROJECT DESIGNER

A person must be accredited as a project designer to design any of the following activities with respect to friable ACBM in a school or public and commercial building: (1) A response action other than a SSSD maintenance activity, (2) a maintenance activity that disturbs friable ACBM other than a SSSD maintenance activity, or (3) a response action for a major fiber release episode. All persons seeking accreditation as a project designer shall complete at least a minimum

3–day training course as outlined below. The project designer course shall include lectures, demonstrations, a field trip, course review and a written examination.

EPA recommends the use of audiovisual materials to complement lectures, where appropriate.

The abatement project designer training course shall adequately address the following topics:

(a) *Background information on asbestos.* Identification of asbestos; examples and discussion of the uses and locations of asbestos in buildings; physical appearance of asbestos.

(b) *Potential health effects related to asbestos exposure.* Nature of asbestos-related diseases; routes of exposure; dose-response relationships and the lack of a safe exposure level; the synergistic effect between cigarette smoking and asbestos exposure; the latency period of asbestos-related diseases; a discussion of the relationship between asbestos exposure and asbestosis, lung cancer, mesothelioma, and cancers of other organs.

(c) *Overview of abatement construction projects.* Abatement as a portion of a renovation project; OSHA requirements for notification of other contractors on a multi-employer site (29 CFR 1926.58).

(d) *Safety system design specifications.* Design, construction, and maintenance of containment barriers and decontamination enclosure systems; positioning of warning signs; electrical and ventilation system lockout; proper working techniques for minimizing fiber release; entry and exit procedures for the work area; use of wet methods; proper techniques for initial cleaning; use of negative-pressure exhaust ventilation equipment; use of HEPA vacuums; proper clean-up and disposal of asbestos; work practices as they apply to encapsulation, enclosure, and repair; use of glove bags and a demonstration of glove bag use.

(e) *Field trip.* A visit to an abatement site or other suitable building site, including on-site discussions of abatement design and building walk-through inspection. Include discussion of rationale for the concept of functional spaces during the walk-through.

(f) *Employee personal protective equipment.* Classes and characteristics of respirator types; limitations of respirators; proper selection, inspection; donning, use, maintenance, and storage procedures for respirators; methods for field testing of the facepiece-to-face seal (positive and negative-pressure fit checks); qualitative and quantitative fit testing procedures; variability between field and laboratory protection factors that alter respiratory fit (e.g., facial hair); the components of a proper respiratory protection program; selection and use of personal protective clothing; use, storage, and handling of non-disposable clothing.

(g) *Additional safety hazards.* Hazards encountered during abatement activities and how to deal with them, including electrical hazards, heat stress, air contaminants other than asbestos, fire, and explosion hazards.

(h) *Fiber aerodynamics and control.* Aerodynamic characteristics of asbestos fibers; importance of proper containment barriers; settling time for asbestos fibers; wet methods in abatement; aggressive air monitoring following abatement; aggressive air movement and negative-pressure exhaust ventilation as a clean-up method.

(i) *Designing abatement solutions.* Discussions of removal, enclosure, and encapsulation methods; asbestos waste disposal.

(j) *Final clearance process.* Discussion of the need for a written sampling rationale for aggressive final air clearance; requirements of a complete visual inspection; and the relationship of the visual inspection to final air clearance.

EPA recommends the use of TEM for analysis of final air clearance samples. These samples should be analyzed by laboratories accredited under the NIST NVLAP.

(k) *Budgeting/cost estimating.* Development of cost estimates; present costs of abatement versus future operation and maintenance costs; setting priorities for abatement jobs to reduce costs.

(l) *Writing abatement specifications.* Preparation of and need for a written project design; means and methods specifications versus performance specifications; design of abatement in occupied buildings; modification of guide specifications for a particular building; worker and building occupant health/medical considerations; replacement of ACM with non-asbestos substitutes.

(m) *Preparing abatement drawings.* Significance and need for drawings, use of as-built drawings as base drawings; use of inspection photographs and on-site reports; methods of preparing abatement drawings; diagramming containment barriers; relationship of drawings to design specifications; particular problems related to abatement drawings.

(n) *Contract preparation and administration.*

(o) *Legal/liabilities/defenses.* Insurance considerations; bonding; hold-harmless clauses; use of abatement contractor's liability insurance; claims made versus occurrence policies.

(p) *Replacement.* Replacement of asbestos with asbestos-free substitutes.

(q) *Role of other consultants.* Development of technical specification sections by industrial hygienists or engineers; the multi-disciplinary team approach to abatement design.

(r) *Occupied buildings.* Special design procedures required in occupied buildings; education of occupants; extra monitoring recommendations; staging of work to minimize occupant exposure; scheduling of renovation to minimize exposure.

(s) *Relevant Federal, State, and local regulatory requirements, procedures and standards, including, but not limited to:*

(i) Requirements of TSCA Title II.

(ii) National Emission Standards for Hazardous Air Pollutants, (40 CFR part 61) subparts A (General Provisions) and M (National Emission Standard for Asbestos).

(iii) OSHA Respirator Standard found at 29 CFR 1910.134.

(iv) EPA Worker Protection Rule found at 40 CFR part 763, subpart G.

(v) OSHA Asbestos Construction Standard found at 29 CFR 1926.58.

(vi) OSHA Hazard Communication Standard found at 29 CFR 1926.59.

(t) *Course review.* A review of key aspects of the training course.

6. PROJECT MONITOR

EPA recommends that States adopt training and accreditation requirements for persons seeking to perform work as project monitors. Project monitors observe abatement activities performed by contractors and generally serve as a building owner's representative to ensure that abatement work is completed according to specification and in compliance with all relevant statutes and regulations. They may also perform the vital role of air monitoring for purposes of determining final clearance. EPA recommends that a State seeking to accredit individuals as project monitors consider adopting a minimum 5–day training course covering the topics outlined below. The course outlined below consists of lectures and demonstrations, at least 6 hours of hands-on training, course review, and a written examination. The hands-on training component might be satisfied by having the student simulate participation in or performance of any of the relevant job functions or activities (or by incorporation of the workshop component described in item ''n'' below of this unit).

EPA recommends that the project monitor training course adequately address the following topics:

(a) *Roles and responsibilities of the project monitor.* Definition and responsibilities of the project monitor, including regulatory/specification compliance monitoring, air monitoring, conducting visual inspections, and final clearance monitoring.

(b) *Characteristics of asbestos and asbestos-containing materials.* Typical uses of asbestos; physical appearance of asbestos; review of asbestos abatement and control techniques; presentation of the health effects of asbestos exposure, including routes of exposure, dose-response relationships, and latency periods for asbestos-related diseases.

(c) *Federal asbestos regulations.* Overview of pertinent EPA regulations, including: NESHAP, 40 CFR part 61, subparts A and M; AHERA, 40 CFR part 763, subpart E; and the EPA Worker Protection Rule, 40 CFR part 763, subpart G. Overview of pertinent OSHA regulations, including: Construction Industry Standard for Asbestos, 29 CFR 1926.58; Respirator Standard, 29 CFR 1910.134; and the Hazard Communication Standard, 29 CFR 1926.59. Applicable State and local asbestos regulations; regulatory interrelationships.

(d) *Understanding building construction and building systems.* Building construction basics, building physical plan layout; understanding building systems (HVAC, electrical, etc.); layout and organization, where asbestos is likely to be found on building systems; renovations and the effect of asbestos abatement on building systems.

(e) *Asbestos abatement contracts, specifications, and drawings.* Basic provisions of the contract; relationships between principle parties, establishing chain of command; types of specifications, including means and methods, performance, and proprietary and nonproprietary; reading and interpreting records and abatement drawings; discussion of change orders; common enforcement responsibilities and authority of project monitor.

(f) *Response actions and abatement practices.* Pre-work inspections; pre-work considerations, precleaning of the work area, removal of furniture, fixtures, and equipment; shutdown/modification of building systems; construction and maintenance of containment barriers, proper demarcation of work areas; work area entry/exit, hygiene practices; determining the effectiveness of air filtration equipment; techniques for minimizing fiber release, wet methods, continuous cleaning; abatement methods other than removal; abatement area clean-up procedures; waste transport and disposal procedures; contingency planning for emergency response.

(g) *Asbestos abatement equipment.* Typical equipment found on an abatement project; air filtration devices, vacuum systems, negative pressure differential monitoring; HEPA filtration units, theory of filtration, design/construction of HEPA filtration units, qualitative and quantitative performance of HEPA filtration units, sizing the ventilation requirements, location of HEPA filtration units, qualitative and quantitative tests of containment barrier integrity; best available technology.

(h) *Personal protective equipment.* Proper selection of respiratory protection; classes and characteristics of respirator types, limitations of respirators; proper use of other safety equipment, protective clothing selection, use, and proper handling, hard/bump hats, safety shoes; breathing air systems, high pressure v. low pressure, testing for Grade D air, determining proper backup air volumes.

(i) *Air monitoring strategies.* Sampling equipment, sampling pumps (low v. high volume), flow regulating devices (critical and

limiting orifices), use of fibrous aerosol monitors on abatement projects; sampling media, types of filters, types of cassettes, filter orientation, storage and shipment of filters; calibration techniques, primary calibration standards, secondary calibration standards, temperature/pressure effects, frequency of calibration, recordkeeping and field work documentation, calculations; air sample analysis, techniques available and limitations of AHERA on their use, transmission electron microscopy (background to sample preparation and analysis, air sample conditions which prohibit analysis, EPA's recommended technique for analysis of final air clearance samples), phase contrast microscopy (background to sample preparation, and AHERA's limits on the use of phase contrast microscopy), what each technique measures; analytical methodologies, AHERA TEM protocol, NIOSH 7400, OSHA reference method (non clearance), EPA recommendation for clearance (TEM); sampling strategies for clearance monitoring, types of air samples (personal breathing zone v. fixed-station area) sampling location and objectives (pre-abatement, during abatement, and clearance monitoring), number of samples to be collected, minimum and maximum air volumes, clearance monitoring (post-visual-inspection) (number of samples required, selection of sampling locations, period of sampling, aggressive sampling, interpretations of sampling results, calculations), quality assurance; special sampling problems, crawl spaces, acceptable samples for laboratory analysis, sampling in occupied buildings (barrier monitoring).

(j) *Safety and health issues other than asbestos.* Confined-space entry, electrical hazards, fire and explosion concerns, ladders and scaffolding, heat stress, air contaminants other than asbestos, fall hazards, hazardous materials on abatement projects.

(k) *Conducting visual inspections.* Inspections during abatement, visual inspections using the ASTM E1368 document; conducting inspections for completeness of removal; discussion of ''how clean is clean?''

(l) *Legal responsibilities and liabilities of project monitors.* Specification enforcement capabilities; regulatory enforcement; licensing; powers delegated to project monitors through contract documents.

(m) *Recordkeeping and report writing.* Developing project logs/daily logs (what should be included, who sees them); final report preparation; recordkeeping under Federal regulations.

(n) *Workshops (6 hours spread over 3 days).* Contracts, specifications, and drawings: This workshop could consist of each participant being issued a set of contracts, specifications, and drawings and then being asked to answer questions and make recommendations to a project architect, engineer or to the building owner based on given conditions and these documents.

Air monitoring strategies/asbestos abatement equipment: This workshop could consist of simulated abatement sites for which sampling strategies would have to be developed (i.e., occupied buildings, industrial situations). Through demonstrations and exhibition, the project monitor may also be able to gain a better understanding of the function of various pieces of equipment used on abatement projects (air filtration units, water filtration units, negative pressure monitoring devices, sampling pump calibration devices, etc.).

Conducting visual inspections: This workshop could consist, ideally, of an interactive video in which a participant is ''taken through'' a work area and asked to make notes of what is seen. A series of questions will be asked which are designed to stimulate a person's recall of the area. This workshop could consist of a series of two or three videos with different site conditions and different degrees of cleanliness.

C. Examinations

1. Each State shall administer a closed book examination or designate other entities such as State-approved providers of training courses to administer the closed-book examination to persons seeking accreditation who have completed an initial training course. Demonstration testing may also be included as part of the examination. A person seeking initial accreditation in a specific discipline must pass the examination for that discipline in order to receive accreditation. For example, a person seeking accreditation as an abatement project designer must pass the State's examination for abatement project designer.

States may develop their own examinations, have providers of training courses develop examinations, or use standardized examinations developed for purposes of accreditation under TSCA Title II. In addition, States may supplement standardized examinations with questions about State regulations. States may obtain commercially developed standardized examinations, develop standardized examinations independently, or do so in cooperation with other States, or with commercial or non-profit providers on a regional or national basis. EPA recommends the use of standardized, scientifically-validated testing instruments, which may be beneficial in terms of both promoting competency and in fostering accreditation reciprocity between States.

Each examination shall adequately cover the topics included in the training course for that discipline. Each person who completes a

training course, passes the required examination, and fulfills whatever other requirements the State imposes must receive an accreditation certificate in a specific discipline. Whether a State directly issues accreditation certificates, or authorizes training providers to issue accreditation certificates, each certificate issued to an accredited person must contain the following minimum information:

a. A unique certificate number

b. Name of accredited person

c. Discipline of the training course completed.

d. Dates of the training course.

e. Date of the examination.

f. An expiration date of 1 year after the date upon which the person successfully completed the course and examination.

g. The name, address, and telephone number of the training provider that issued the certificate.

h. A statement that the person receiving the certificate has completed the requisite training for asbestos accreditation under TSCA Title II.

States or training providers who reaccredit persons based upon completion of required refresher training must also provide accreditation certificates with all of the above information, except the examination date may be omitted if a State does not require a refresher examination for reaccreditation.

Where a State licenses accredited persons but has authorized training providers to issue accreditation certificates, the State may issue licenses in the form of photo-identification cards. Where this applies, EPA recommends that the State licenses should include all of the same information required for the accreditation certificates. A State may also choose to issue photo-identification cards in addition to the required accreditation certificates.

Accredited persons must have their initial and current accreditation certificates at the location where they are conducting work.

2. The following are the requirements for examination in each discipline:

a. Worker:

i. 50 multiple-choice questions

ii. Passing score: 70 percent correct

b. Contractor/Supervisor:

i. 100 multiple-choice questions

ii. Passing score: 70 percent correct

c. Inspector:

i. 50 Multiple-choice questions

ii. Passing score: 70 percent correct

d. Management Planner:

i. 50 Multiple-choice questions

ii. Passing score: 70 percent correct

e. Project Designer:

i. 100 multiple-choice questions

ii. Passing score: 70 percent correct

D. Continuing Education

For all disciplines, a State's accreditation program shall include annual refresher training as a requirement for reaccreditation as indicated below:

1. Workers: One full day of refresher training.

2. Contractor/Supervisors: One full day of refresher training.

3. Inspectors: One half-day of refresher training.

4. Management Planners: One half-day of inspector refresher training and one half-day of refresher training for management planners.

5. Project Designers: One full day of refresher training.

The refresher courses shall be specific to each discipline. Refresher courses shall be conducted as separate and distinct courses and not combined with any other training during the period of the refresher course. For each discipline, the refresher course shall review and discuss changes in Federal, State, and local regulations, developments in state-of-the-art procedures, and a review of key aspects of the initial training course as determined by the State. After completing the annual refresher course, persons shall have their accreditation extended for an additional year from the date of the refresher course. A State may consider requiring persons to pass reaccreditation examinations at specific intervals (for example, every 3 years).

EPA recommends that States formally establish a 12-month grace period to enable formerly accredited persons with expired certificates to complete refresher training and have their accreditation status reinstated without having to re-take the initial training course.

E. Qualifications

In addition to requiring training and an examination, a State may require candidates for accreditation to meet other qualification and/or experience standards that the State considers appropriate for some or all disciplines. States may choose to consider requiring qualifications similar to the examples outlined below for inspectors, management planners and project designers. States may modify these examples as appropriate. In addition, States may want to include some requirements based on experience in performing a task directly as a part of a job or in an apprenticeship role. They may also wish to consider additional criteria for the approval of training course instructors beyond those prescribed by EPA.

1. Inspectors: Qualifications - possess a high school diploma. States may want to require an Associate's Degree in specific fields (e.g., environmental or physical sciences).

2. Management Planners: Qualifications - Registered architect, engineer, or certified industrial hygienist or related scientific field.

3. Project Designers: Qualifications - registered architect, engineer, or certified industrial hygienist.

4. Asbestos Training Course Instructor: Qualifications - academic credentials and/or field experience in asbestos abatement.

EPA recommends that States prescribe minimum qualification standards for training instructors employed by training providers.

F. Recordkeeping Requirements for Training Providers

All approved providers of accredited asbestos training courses must comply with the following minimum recordkeeping requirements.

1. Training course materials. A training provider must retain copies of all instructional materials used in the delivery of the classroom training such as student manuals, instructor notebooks and handouts.

2. Instructor qualifications. A training provider must retain copies of all instructors' resumes, and the documents approving each instructor issued by either EPA or a State. Instructors must be approved by either EPA or a State before teaching courses for accreditation purposes. A training provider must notify EPA or the State, as appropriate, in advance whenever it changes course instructors. Records must accurately identify the instructors that taught each particular course for each date that a course is offered.

3. Examinations. A training provider must document that each person who receives an accreditation certificate for an initial training course has achieved a passing score on the examination. These records must clearly indicate the date upon which the exam was administered, the training course and discipline for which the exam was given, the name of the person who proctored the exam, a copy of the exam, and the name and test score of each person taking the exam. The topic and dates of the training course must correspond to those listed on that person's accreditation certificate. States may choose to apply these same requirements to examinations for refresher training courses.

4. Accreditation certificates. The training providers or States, whichever issues the accreditation certificate, shall maintain records that document the names of all persons who have been awarded certificates, their certificate numbers, the disciplines for which accreditation was conferred, training and expiration dates, and the training location. The training provider or State shall maintain the records in a manner that allows verification by telephone of the required information.

5. Verification of certificate information. EPA recommends that training providers of refresher training courses confirm that their students possess valid accreditation before granting course admission. EPA further recommends that training providers offering the initial management planner training course verify that students have met the prerequisite of possessing valid inspector accreditation at the time of course admission.

6. Records retention and access. (a) The training provider shall maintain all required records for a minimum of 3 years. The training provider, however, may find it advantageous to retain these records for a longer period of time.

(b) The training provider must allow reasonable access to all of the records required by the MAP, and to any other records which may be required by States for the approval of asbestos training providers or the accreditation of asbestos training courses, to both EPA and to State Agencies, on request. EPA encourages training providers to make this information equally accessible to the general public.

(c) If a training provider ceases to conduct training, the training provider shall notify the approving government body (EPA or the State) and give it the opportunity to take possession of that providers asbestos training records.

G. Deaccreditation

1. States must establish criteria and procedures for deaccrediting persons accredited as workers, contractor/supervisors, inspectors, management planners, and project designers. States must follow their own administrative procedures in pursuing deaccreditation actions. At a minimum, the criteria shall include:

(a) Performing work requiring accreditation at a job site without being in physical possession of initial and current accreditation certificates;

(b) Permitting the duplication or use of one's own accreditation certificate by another;

(c) Performing work for which accreditation has not been received; or

(d) Obtaining accreditation from a training provider that does not have approval to offer training for the particular discipline from either EPA or from a State that has a contractor accreditation plan at least as stringent as the EPA MAP.

EPA may directly pursue deaccreditation actions without reliance on State deaccreditation or enforcement authority or actions. In addition to the above-listed situations, the Administrator may suspend or revoke the accreditation of persons who have been subject to a final order imposing a civil penalty or convicted under section 16 of TSCA, 15 U.S.C. 2615 or 2647, for violations of 40 CFR part 763, or section 113 of the Clean

Air Act, 42 U.S.C. 7413, for violations of 40 CFR part 61, subpart M.

2. Any person who performs asbestos work requiring accreditation under section 206(a) of TSCA, 15 U.S.C. 2646(a), without such accreditation is in violation of TSCA. The following persons are not accredited for purposes of section 206(a) of TSCA:

(a) Any person who obtains accreditation through fraudulent representation of training or examination documents;

(b) Any person who obtains training documentation through fraudulent means;

(c) Any person who gains admission to and completes refresher training through fraudulent representation of initial or previous refresher training documentation; or

(d) Any person who obtains accreditation through fraudulent representation of accreditation requirements such as education, training, professional registration, or experience.

H. Reciprocity

EPA recommends that each State establish reciprocal arrangements with other States that have established accreditation programs that meet or exceed the requirements of the MAP. Such arrangements might address cooperation in licensing determinations, the review and approval of training programs and/or instructors, candidate testing and exam administration, curriculum development, policy formulation, compliance monitoring, and the exchange of information and data. The benefits to be derived from these arrangements include a potential cost-savings from the reduction of duplicative activity and the attainment of a more professional accredited workforce as States are able to refine and improve the effectiveness of their programs based upon the experience and methods of other States.

I. Electronic Reporting

States that choose to receive electronic documents must include, at a minimum, the requirements of 40 CFR Part 3—(Electronic reporting) in their programs.

II. EPA Approval Process for State Accreditation Programs

A. States may seek approval for a single discipline or all disciplines as specified in the MAP. For example, a State that currently only requires worker accreditation may receive EPA approval for that discipline alone. EPA encourages States that currently do not have accreditation requirements for all disciplines required under section 206(b)(2) of TSCA, 15 U.S.C. 2646(b)(2), to seek EPA approval for those disciplines the State does accredit. As States establish accreditation requirements for the remaining disciplines, the requested information outlined below should be submitted to EPA as soon as possible. Any State that had an accreditation program approved by EPA under an earlier version of the MAP may follow the same procedures to obtain EPA approval of their accreditation program under this MAP.

B. Partial approval of a State Program for the accreditation of one or more disciplines does not mean that the State is in full compliance with TSCA where the deadline for that State to have adopted a State Plan no less stringent than the MAP has already passed. State Programs which are at least as stringent as the MAP for one or more of the accredited disciplines may, however, accredit persons in those disciplines only.

C. States seeking EPA approval or reapproval of accreditation programs shall submit the following information to the Regional Asbestos Coordinator at their EPA Regional office:

1. A copy of the legislation establishing or upgrading the State's accreditation program (if applicable).

2. A copy of the State's accreditation regulations or revised regulations.

3. A letter to the Regional Asbestos Coordinator that clearly indicates how the State meets the program requirements of this MAP. Addresses for each of the Regional Asbestos Coordinators are shown below:

EPA, Region I, (OES05–1) Asbestos Coordinator, 5 Post Office Square—Suite 100, Boston, MA 02109–3912, (617) 918–1016.

EPA, Region II, (MS-500), Asbestos Coordinator, 2890 Woodbridge Ave., Edison, NJ 08837-3679, (908) 321-6671.

EPA, Region III, (3AT-33), Asbestos Coordinator, 841 Chestnut Bldg., Philadelphia, PA 19107, (215) 597-3160.

EPA, Region IV, Asbestos Coordinator, 345 Courtland St., N.E., Atlanta, GA 30365, (404) 347-5014.

EPA, Region V, (SP-14J), Asbestos Coordinator, 77 W. Jackson Blvd., Chicago, IL 60604-3590, (312) 886-6003.

EPA, Region VI, (6T-PT), Asbestos Coordinator, 1445 Ross Ave. Dallas, TX 75202-2744, (214) 655-7244.

EPA, Region VII, (ARTX/ASBS), Asbestos Coordinator, 726 Minnesota Ave., Kansas City, KS 66101, (913) 551-7020.

EPA, Region VIII, (8AT-TS), Asbestos Coordinator, 1 Denver Place, Suite 500 999 - 18th St., Denver, CO 80202-2405, (303) 293-1442.

EPA, Region IX, Asbestos NESHAPs Contact, Air Division (A–5), 75 Hawthorne Street, San Francisco, CA 94105, (415) 972–3989.

EPA, Region X, (AT-083), Asbestos Coordinator, 1200 Sixth Ave., Seattle, WA 98101, (206) 553-4762.

EPA maintains a listing of all those States that have applied for and received EPA approval for having accreditation requirements that are at least as stringent as the MAP for one or more disciplines. Any training courses

approved by an EPA-approved State Program are considered to be EPA-approved for purposes of accreditation.

III. Approval of Training Courses

Individuals or groups wishing to sponsor training courses for disciplines required to be accredited under section 206(b)(1)(A) of TSCA, 15 U.S.C. 2646(b)(1)(A), may apply for approval from States that have accreditation program requirements that are at least as stringent as this MAP. For a course to receive approval, it must meet the requirements for the course as outlined in this MAP, and any other requirements imposed by the State from which approval is being sought. Courses that have been approved by a State with an accreditation program at least as stringent as this MAP are approved under section 206(a) of TSCA, 15 U.S.C. 2646(a), for that particular State, and also for any other State that does not have an accreditation program as stringent as this MAP.

A. Initial Training Course Approval

A training provider must submit the following minimum information to a State as part of its application for the approval of each training course:

1. The course provider's name, address, and telephone number.
2. A list of any other States that currently approve the training course.
3. The course curriculum.
4. A letter from the provider of the training course that clearly indicates how the course meets the MAP requirements for:
a. Length of training in days.
b. Amount and type of hands-on training.
c. Examination (length, format, and passing score).
d. Topics covered in the course.
5. A copy of all course materials (student manuals, instructor notebooks, handouts, etc.).
6. A detailed statement about the development of the examination used in the course.
7. Names and qualifications of all course instructors. Instructors must have academic and/or field experience in asbestos abatement.
8. A description of and an example of the numbered certificates issued to students who attend the course and pass the examination.

B. Refresher Training Course Approval

The following minimum information is required for approval of refresher training courses by States:

1. The length of training in half-days or days.
2. The topics covered in the course.
3. A copy of all course materials (student manuals, instructor notebooks, handouts, etc.).
4. The names and qualifications of all course instructors. Instructors must have academic and/or field experience in asbestos abatement.
5. A description of and an example of the numbered certificates issued to students who complete the refresher course and pass the examination, if required.

C. Withdrawal of Training Course Approval

States must establish criteria and procedures for suspending or withdrawing approval from accredited training programs. States should follow their own administrative procedures in pursuing actions for suspension or withdrawal of approval of training programs. At a minimum, the criteria shall include:

(1) Misrepresentation of the extent of a training course's approval by a State or EPA;
(2) Failure to submit required information or notifications in a timely manner;
(3) Failure to maintain requisite records;
(4) Falsification of accreditation records, instructor qualifications, or other accreditation information; or
(5) Failure to adhere to the training standards and requirements of the EPA MAP or State Accreditation Program, as appropriate.

In addition to the criteria listed above, EPA may also suspend or withdraw a training course's approval where an approved training course instructor, or other person with supervisory authority over the delivery of training has been found in violation of other asbestos regulations administered by EPA. An administrative or judicial finding of violation, or execution of a consent agreement and order under 40 CFR 22.18, constitutes evidence of a failure to comply with relevant statutes or regulations. States may wish to adopt this criterion modified to include their own asbestos statutes or regulations. EPA may also suspend or withdraw approval of training programs where a training provider has submitted false information as a part of the self-certification required under Unit V.B. of the revised MAP.

Training course providers shall permit representatives of EPA or the State which approved their training courses to attend, evaluate, and monitor any training course without charge. EPA or State compliance inspection staff are not required to give advance notice of their inspections. EPA may suspend or withdraw State or EPA approval of a training course based upon the criteria specified in this Unit III.C.

IV. EPA Procedures for Suspension or Revocation of Accreditation or Training Course Approval.

A. If the Administrator decides to suspend or revoke the accreditation of any person or

suspend or withdraw the approval of a training course, the Administrator will notify the affected entity of the following:

1. The grounds upon which the suspension, revocation, or withdrawal is based.

2. The time period during which the suspension, revocation, or withdrawal is effective, whether permanent or otherwise.

3. The conditions, if any, under which the affected entity may receive accreditation or approval in the future.

4. Any additional conditions which the Administrator may impose.

5. The opportunity to request a hearing prior to final Agency action to suspend or revoke accreditation or suspend or withdraw approval.

B. If a hearing is requested by the accredited person or training course provider pursuant to the preceding paragraph, the Administrator will:

1. Notify the affected entity of those assertions of law and fact upon which the action to suspend, revoke, or withdraw is based.

2. Provide the affected entity an opportunity to offer written statements of facts, explanations, comments, and arguments relevant to the proposed action.

3. Provide the affected entity such other procedural opportunities as the Administrator may deem appropriate to ensure a fair and impartial hearing.

4. Appoint an EPA attorney as Presiding Officer to conduct the hearing. No person shall serve as Presiding Officer if he or she has had any prior connection with the specific case.

C. The Presiding Officer appointed pursuant to the preceding paragraph shall:

1. Conduct a fair, orderly, and impartial hearing, without unnecessary delay.

2. Consider all relevant evidence, explanation, comment, and argument submitted pursuant to the preceding paragraph.

3. Promptly notify the affected entity of his or her decision and order. Such an order is a final Agency action.

D. If the Administrator determines that the public health, interest, or welfare warrants immediate action to suspend the accreditation of any person or the approval of any training course provider, the Administrator will:

1. Notify the affected entity of the grounds upon which the emergency suspension is based;

2. Notify the affected entity of the time period during which the emergency suspension is effective.

3. Notify the affected entity of the Administrator's intent to suspend or revoke accreditation or suspend or withdraw training course approval, as appropriate, in accordance with Unit IV.A. above. If such suspension, revocation, or withdrawal notice has not previously been issued, it will be issued at the same time the emergency suspension notice is issued.

E. Any notice, decision, or order issued by the Administrator under this section, and any documents filed by an accredited person or approved training course provider in a hearing under this section, shall be available to the public except as otherwise provided by section 14 of TSCA or by 40 CFR part 2. Any such hearing at which oral testimony is presented shall be open to the public, except that the Presiding Officer may exclude the public to the extent necessary to allow presentation of information which may be entitled to confidential treatment under section 14 of TSCA or 40 CFR part 2.

V. Implementation Schedule

The various requirements of this MAP become effective in accordance with the following schedules:

A. Requirements applicable to State Programs

1. Each State shall adopt an accreditation plan that is at least as stringent as this MAP within 180 days after the commencement of the first regular session of the legislature of the State that is convened on or after April 4, 1994.

2. If a State has adopted an accreditation plan at least as stringent as this MAP as of April 4, 1994, the State may continue to:

a. Conduct TSCA training pursuant to this MAP.

b. Approve training course providers to conduct training and to issue accreditation that satisfies the requirements for TSCA accreditation under this MAP.

c. Issue accreditation that satisfies the requirements for TSCA accreditation under this MAP.

3. A State that had complied with an earlier version of the MAP, but has not adopted an accreditation plan at least as stringent as this MAP by April 4, 1994, may:

a. Conduct TSCA training which remains in compliance with the requirements of Unit V.B. of this MAP. After such training has been self-certified in accordance with Unit V.B. of this MAP, the State may issue accreditation that satisfies the requirement for TSCA accreditation under this MAP.

b. Sustain its approval for any training course providers to conduct training and issue TSCA accreditation that the State had approved before April 4, 1994, and that remain in compliance with Unit V.B. of this MAP.

c. Issue accreditation pursuant to an earlier version of the MAP that provisionally satisfies the requirement for TSCA accreditation until October 4, 1994.

Such a State may not approve new TSCA training course providers to conduct training or to issue TSCA accreditation that satisfies

the requirements of this MAP until the State adopts an accreditation plan that is at least as stringent as this MAP.

4. A State that had complied with an earlier version of the MAP, but fails to adopt a plan as stringent as this MAP by the deadline established in Unit V.A.1., is subject to the following after that deadline date:

a. The State loses any status it may have held as an EPA-approved State for accreditation purposes under section 206 of TSCA, 15 U.S.C. 2646.

b. All training course providers approved by the State lose State approval to conduct training and issue accreditation that satisfies the requirements for TSCA accreditation under this MAP.

c. The State may not:

i. Conduct training for accreditation purposes under section 206 of TSCA, 15 U.S.C. 2646.

ii. Approve training course providers to conduct training or issue accreditation that satisfies the requirements for TSCA accreditation; or

iii. Issue accreditation that satisfies the requirement for TSCA accreditation.

EPA will extend EPA-approval to any training course provider that loses State approval because the State does not comply with the deadline, so long as the provider is in compliance with Unit V.B. of this MAP, and the provider is approved by a State that had complied with an earlier version of the MAP as of the day before the State loses its EPA approval.

5. A State that does not have an accreditation program that satisfies the requirements for TSCA accreditation under either an earlier version of the MAP or this MAP, may not:

a. Conduct training for accreditation purposes under section 206 of TSCA, 15 U.S.C. 2646;

b. Approve training course providers to conduct training or issue accreditation that satisfies the requirements for TSCA accreditation; or

c. Issue accreditation that satisfies the requirement for TSCA accreditation.

B. Requirements applicable to Training Courses and Providers

As of October 4, 1994, an approved training provider must certify to EPA and to any State that has approved the provider for TSCA accreditation, that each of the provider's training courses complies with the requirements of this MAP. The written submission must document in specific detail the changes made to each training course in order to comply with the requirements of this MAP and clearly state that the provider is also in compliance with all other requirements of this MAP, including the new recordkeeping and certificate provisions. Each submission must include the following statement signed by an authorized representative of the training provider: ''Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (18 U.S.C. 1001 and 15 U.S.C. 2615), I certify that the training described in this submission complies with all applicable requirements of Title II of TSCA, 40 CFR part 763, Appendix C to Subpart E, as revised, and any other applicable Federal, state, or local requirements.'' A consolidated self-certification submission from each training provider that addresses all of its approved training courses is permissible and encouraged.

The self-certification must be sent via registered mail, to EPA Headquarters at the following address: Attn. Self-Certification Program, Field Programs Branch, Chemical Management Division (7404), Office of Pollution Prevention and Toxics, Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460. A duplicate copy of the complete submission must also be sent to any States from which approval had been obtained.

The timely receipt of a complete self-certification by EPA and all approving States shall have the effect of extending approval under this MAP to the training courses offered by the submitting provider. If a self-certification is not received by the approving government bodies on or before the due date, the affected training course is not approved under this MAP. Such training providers must then reapply for approval of these training courses pursuant to the procedures outlined in Unit III.

C. Requirements applicable to Accredited Persons.

Persons accredited by a State with an accreditation program no less stringent than an earlier version of the MAP or by an EPA-approved training provider as of April 3, 1994, are accredited in accordance with the requirements of this MAP, and are not required to retake initial training. They must continue to comply with the requirements for annual refresher training in Unit I.D. of the revised MAP.

D. Requirements applicable to Non-Accredited Persons.

In order to perform work requiring accreditation under TSCA Title II, persons who are not accredited by a State with an accreditation program no less stringent than an earlier version of the MAP or by an EPA-approved training provider as of April 3, 1994, must comply with the upgraded training requirements of this MAP by no later than October 4, 1994. Non-accredited persons may obtain initial accreditation on a provisional basis by successfully completing any of the training programs approved under an earlier

version of the MAP, and thereby perform work during the first 6 months after this MAP takes effect. However, by October 4, 1994, these persons must have successfully completed an upgraded training program that fully complies with the requirements of this MAP in order to continue to perform work requiring accreditation under section 206 of TSCA, 15 U.S.C. 2646.

[59 FR 5251, Feb. 3, 1994, as amended at 60 FR 31922, June 19, 1995; 70 FR 59889, Oct. 13, 2005; 75 FR 69353, Nov. 12, 2010; 76 FR 49674, Aug. 11, 2011]

APPENDIX D TO SUBPART E OF PART 763—TRANSPORT AND DISPOSAL OF ASBESTOS WASTE

For the purposes of this appendix, transport is defined as all activities from receipt of the containerized asbestos waste at the generation site until it has been unloaded at the disposal site. Current EPA regulations state that there must be no visible emissions to the outside air during waste transport. However, recognizing the potential hazards and subsequent liabilities associated with exposure, the following additional precautions are recommended.

Recordkeeping. Before accepting wastes, a transporter should determine if the waste is properly wetted and containerized. The transporter should then require a chain-of-custody form signed by the generator. A chain-of-custody form may include the name and address of the generator, the name and address of the pickup site, the estimated quantity of asbestos waste, types of containers used, and the destination of the waste. The chain-of-custody form should then be signed over to a disposal site operator to transfer responsibility for the asbestos waste. A copy of the form signed by the disposal site operator should be maintained by the transporter as evidence of receipt at the disposal site.

Waste handling. A transporter should ensure that the asbestos waste is properly contained in leak-tight containers with appropriate labels, and that the outside surfaces of the containers are not contaminated with asbestos debris adhering to the containers. If there is reason to believe that the condition of the asbestos waste may allow significant fiber release, the transporter should not accept the waste. Improper containerization of wastes is a violation of the NESHAPs regulation and should be reported to the appropriate EPA Regional Asbestos NESHAPs contact below:

Region I

Asbestos NESHAPs Contact, Office of Environmental Stewardship, USEPA, Region I, 5 Post Office Square—Suite 100, Boston, MA 02109–3912, (617) 918–1551.

Region II

Asbestos NESHAPs Contact, Air & Waste Management Division, USEPA, Region II, 26 Federal Plaza, New York, NY 10007, (212) 264–6770.

Region III

Asbestos NESHAPs Contact, Air Management Division, USEPA, Region III, 841 Chestnut Street, Philadelphia, PA 19107, (215) 597–9325.

Region IV

Asbestos NESHAPs Contact, Air, Pesticide & Toxic Management, USEPA, Region IV, 345 Courtland Street, NE., Atlanta, GA 30365, (404) 347–4298.

Region V

Asbestos NESHAPs Contact, Air Management Division, USEPA, Region V, 77 West Jackson Boulevard, Chicago, IL 60604, (312) 353–6793.

Region VI

Asbestos NESHAPs Contact, Air & Waste Management Division, USEPA, Region VI, 1445 Ross Avenue, Dallas, TX 75202, (214) 655–7229.

Region VII

Asbestos NESHAPs Contact, Air & Waste Management Division, USEPA, Region VII, 726 Minnesota Avenue, Kansas City, KS 66101, (913) 236–2896.

Region VIII

Asbestos NESHAPs Contact, Air & Waste Management Division, USEPA, Region VIII, 999 18th Street, Suite 500, Denver, CO 80202, (303) 293–1814.

Region IX

Asbestos NESHAPs Contact, Air Division, USEPA, Region IX, 75 Hawthorne Street, San Francisco, CA 94105, (415) 972–3989.

Region X

Asbestos NESHAPs Contact, Air & Toxics Management Division, USEPA, Region X, 1200 Sixth Avenue, Seattle, WA 98101, (206) 442–2724.

Once the transporter is satisfied with the condition of the asbestos waste and agrees to handle it, the containers should be loaded into the transport vehicle in a careful manner to prevent breaking of the containers. Similarly, at the disposal site, the asbestos waste containers should be transferred carefully to avoid fiber release.

Waste transport. Although there are no regulatory specifications regarding the transport vehicle, it is recommended that vehicles used for transport of containerized asbestos

waste have an enclosed carrying compartment or utilize a canvas covering sufficient to contain the transported waste, prevent damage to containers, and prevent fiber release. Transport of large quantities of asbestos waste is commonly conducted in a 20-cubic-yard ''roll off'' box, which should also be covered. Vehicles that use compactors to reduce waste volume should not be used because these will cause the waste containers to rupture. Vacuum trucks used to transport waste slurry must be inspected to ensure that water is not leaking from the truck.

Disposal involves the isolation of asbestos waste material in order to prevent fiber release to air or water. Landfilling is recommended as an environmentally sound isolation method because asbestos fibers are virtually immobile in soil. Other disposal techniques such as incineration or chemical treatment are not feasible due to the unique properties of asbestos. EPA has established asbestos disposal requirements for active and inactive disposal sites under NESHAPs (40 CFR Part 61, subpart M) and specifies general requirements for solid waste disposal under RCRA (40 CFR Part 257). Advance EPA notification of the intended disposal site is required by NESHAPs.

Selecting a disposal facility. An acceptable disposal facility for asbestos wastes must adhere to EPA's requirements of no visible emissions to the air during disposal, or minimizing emissions by covering the waste within 24 hours. The minimum required cover is 6 inches of nonasbestos material, normally soil, or a dust-suppressing chemical. In addition to these Federal requirements, many state or local government agencies require more stringent handling procedures. These agencies usually supply a list of ''approved'' or licensed asbestos disposal sites upon request. Solid waste control agencies are listed in local telephone directories under state, county, or city headings. A list of state solid waste agencies may be obtained by calling the RCRA hotline: 1–800–424–9346 (382–3000 in Washington, DC). Some landfill owners or operators place special requirements on asbestos waste, such as placing all bagged waste into 55-gallon metal drums. Therefore, asbestos removal contractors should contact the intended landfill before arriving with the waste.

Receiving asbestos waste. A landfill approved for receipt of asbestos waste should require notification by the waste hauler that the load contains asbestos. The landfill operator should inspect the loads to verify that asbestos waste is properly contained in leak-tight containers and labeled appropriately. The appropriate EPA Regional Asbestos NESHAPs Contact should be notified if the landfill operator believes that the asbestos waste is in a condition that may cause significant fiber release during disposal. In situations when the wastes are not properly containerized, the landfill operator should thoroughly soak the asbestos with a water spray prior to unloading, rinse out the truck, and immediately cover the wastes with nonasbestos material prior to compacting the waste in the landfill.

Waste deposition and covering. Recognizing the health dangers associated with asbestos exposure, the following procedures are recommended to augment current federal requirements:

• Designate a separate area for asbestos waste disposal. Provide a record for future landowners that asbestos waste has been buried there and that it would be hazardous to attempt to excavate that area. (Future regulations may require property deeds to identify the location of any asbestos wastes and warn against excavation.)

• Prepare a separate trench to receive asbestos wastes. The size of the trench will depend upon the quantity and frequency of asbestos waste delivered to the disposal site. The trenching technique allows application of soil cover without disturbing the asbestos waste containers. The trench should be ramped to allow the transport vehicle to back into it, and the trench should be as narrow as possible to reduce the amount of cover required. If possible, the trench should be aligned perpendicular to prevailing winds.

• Place the asbestos waste containers into the trench carefully to avoid breaking them. Be particularly careful with plastic bags because when they break under pressure asbestos particles can be emitted.

• Completely cover the containerized waste within 24 hours with a minimum of 6 inches of nonasbestos material. Improperly containerized waste is a violation of the NESHAPs and EPA should be notified.

However, if improperly containerized waste is received at the disposal site, it should be covered immediately after unloading. Only after the wastes, including properly containerized wastes, are completely covered, can the wastes be compacted or other heavy equipment run over it. During compacting, avoid exposing wastes to the air or tracking asbestos material away from the trench.

• For final closure of an area containing asbestos waste, cover with at least an additional 30 inches of compacted nonasbestos material to provide a 36-inch final cover. To control erosion of the final cover, it should be properly graded and vegetated. In areas of the United States where excessive soil erosion may occur or the frost line exceeds 3 feet, additional final cover is recommended. In desert areas where vegetation would be difficult to maintain, 3–6 inches of well graded crushed rock is recommended for placement on top of the final cover.

Controlling public access. Under the current NESHAPs regulation, EPA does not require that a landfill used for asbestos disposal use

warning signs or fencing if it meets the requirement to cover asbestos wastes. However, under RCRA, EPA requires that access be controlled to prevent exposure of the public to potential health and safety hazards at the disposal site. Therefore, for liability protection of operators of landfills that handle asbestos, fencing and warning signs are recommended to control public access when natural barriers do not exist. Access to a landfill should be limited to one or two entrances with gates that can be locked when left unattended. Fencing should be installed around the perimeter of the disposal site in a manner adequate to deter access by the general public. Chain-link fencing, 6-ft high and topped with a barbed wire guard, should be used. More specific fencing requirements may be specified by local regulations. Warning signs should be displayed at all entrances and at intervals of 330 feet or less along the property line of the landfill or perimeter of the sections where asbestos waste is deposited. The sign should read as follows:

ASBESTOS WASTE DISPOSAL SITE
BREATHING ASBESTOS DUST MAY CAUSE LUNG DISEASE AND CANCER

Recordkeeping. For protection from liability, and considering possible future requirements for notification on disposal site deeds, a landfill owner should maintain documentation of the specific location and quantity of the buried asbestos wastes. In addition, the estimated depth of the waste below the surface should be recorded whenever a landfill section is closed. As mentioned previously, such information should be recorded in the land deed or other record along with a notice warning against excavation of the area.

[52 FR 41897, Oct. 30, 1987, as amended at 62 FR 1834, Jan. 14, 1997; 75 FR 69353, Nov. 12, 2010; 76 FR 49674, Aug. 11, 2011]

APPENDIX E TO SUBPART E OF PART 763—INTERIM METHOD OF THE DETERMINATION OF ASBESTOS IN BULK INSULATION SAMPLES

SECTION 1. POLARIZED LIGHT MICROSCOPY

1.1 Principle and Applicability

Bulk samples of building materials taken for asbestos identification are first examined for homogeneity and preliminary fiber identification at low magnification. Positive identification of suspect fibers is made by analysis of subsamples with the polarized light microscope.

The principles of optical mineralogy are well established.[1,2] A light microscope equipped with two polarizing filters is used to observe specific optical characteristics of a sample. The use of plane polarized light allows the determination of refractive indices along specific crystallographic axes. Morphology and color are also observed. A retardation plate is placed in the polarized light path for determination of the sign of elongation using orthoscopic illumination. Orientation of the two filters such that their vibration planes are perpendicular (crossed polars) allows observation of the birefringence and extinction characteristics of anisotropic particles.

Quantitative analysis involves the use of point counting. Point counting is a standard technique in petrography for determining the relative areas occupied by separate minerals in thin sections of rock. Background information on the use of point counting[2] and the interpretation of point count data[3] is available.

This method is applicable to all bulk samples of friable insulation materials submitted for identification and quantitation of asbestos components.

1.2 Range

The point counting method may be used for analysis of samples containing from 0 to 100 percent asbestos. The upper detection limit is 100 percent. The lower detection limit is less than 1 percent.

1.3 Interferences

Fibrous organic and inorganic constituents of bulk samples may interfere with the identification and quantitation of the asbestos mineral content. Spray-on binder materials may coat fibers and affect color or obscure optical characteristics to the extent of masking fiber identity. Fine particles of other materials may also adhere to fibers to an extent sufficient to cause confusion in identification. Procedures that may be used for the removal of interferences are presented in Section 1.7.2.2.

1.4 Precision and Accuracy

Adequate data for measuring the accuracy and precision of the method for samples with various matrices are not currently available. Data obtained for samples containing a single asbestos type in a simple matrix are available in the EPA report *Bulk Sample Analysis for Asbestos Content: Evaluation of the Tentative Method*.[4]

1.5 Apparatus

1.5.1 Sample Analysis

A low-power binocular microscope, preferably stereoscopic, is used to examine the bulk insulation sample as received.

- *Microscope:* binocular, 10–45X (approximate).
- *Light Source:* incandescent or fluorescent.
- *Forceps, Dissecting Needles, and Probes*
- *Glassine Paper or Clean Glass Plate*

Compound microscope requirements: A polarized light microscope complete with polarizer, analyzer, port for wave retardation plate, 360° graduated rotating stage, substage condenser, lamp, and lamp iris.

- *Polarized Light Microscope:* described above.
- *Objective Lenses:* 10X, 20X, and 40X or near equivalent.
- *Dispersion Staining Objective Lens* (optional)
- *Ocular Lens:* 10X minimum.
- *Eyepiece Reticle:* cross hair or 25 point Chalkley Point Array.
- *Compensator Plate:* 550 millimicron retardation.

1.5.2 Sample Preparation

Sample preparation apparatus requirements will depend upon the type of insulation sample under consideration. Various physical and/or chemical means may be employed for an adequate sample assessment.

- *Ventilated Hood* or negative pressure glove box.
- *Microscope Slides*
- *Coverslips*
- *Mortar and Pestle:* agate or porcelain. (optional)
- *Wylie Mill* (optional)
- *Beakers and Assorted Glassware* (optional)
- *Certrifuge* (optional)
- *Filtration apparatus* (optional)
- *Low temperature asher* (optional)

1.6 Reagents

1.6.1 Sample Preparation

- *Distilled Water (optional)*
- *Dilute CH_3COOH:* ACS reagent grade (optional)
- *Dilute HCl:* ACS reagent grade (optional)
- *Sodium metaphosphate* $(NaPO_3)_6$ (optional)

1.6.2 Analytical Reagents

Refractive Index Liquids: 1.490–1.570, 1.590–1.720 in increments of 0.002 or 0.004.

- *Refractive Index Liquids for Dispersion Staining:* high-dispersion series, 1.550, 1.605, 1.630 (optional).
- *UICC Asbestos Reference Sample Set:* Available from: UICC MRC Pneumoconiosis Unit, Llandough Hospital, Penarth, Glamorgan CF6 1XW, UK, and commercial distributors.
- *Tremolite-asbestos* (source to be determined)
- *Actinolite-asbestos* (source to be determined)

1.7 Procedures

NOTE: Exposure to airborne asbestos fibers is a health hazard. Bulk samples submitted for analysis are usually friable and may release fibers during handling or matrix reduction steps. All sample and slide preparations should be carried out in a ventilated hood or glove box with continuous airflow (negative pressure). Handling of samples without these precautions may result in exposure of the analyst and contamination of samples by airborne fibers.

1.7.1 Sampling

Samples for analysis of asbestos content shall be taken in the manner prescribed in Reference 5 and information on design of sampling and analysis programs may be found in Reference 6. If there are any questions about the representative nature of the sample, another sample should be requested before proceeding with the analysis.

1.7.2 Analysis

1.7.2.1 Gross Examination

Bulk samples of building materials taken for the identification and quantitation of asbestos are first examined for homogeneity at low magnification with the aid of a stereomicroscope. The core sample may be examined in its container or carefully removed from the container onto a glassine transfer paper or clean glass plate. If possible, note is made of the top and bottom orientation. When discrete strata are identified, each is treated as a separate material so that fibers are first identified and quantified in that layer only, and then the results for each layer are combined to yield an estimate of asbestos content for the whole sample.

1.7.2.2 Sample Preparation

Bulk materials submitted for asbestos analysis involve a wide variety of matrix materials. Representative subsamples may not be readily obtainable by simple means in heterogeneous materials, and various steps may be required to alleviate the difficulties encountered. In most cases, however, the best preparation is made by using forceps to sample at several places from the bulk material. Forcep samples are immersed in a refractive index liquid on a microscope slide, teased apart, covered with a cover glass, and observed with the polarized light microscope.

Alternatively, attempts may be made to homogenize the sample or eliminate interferences before further characterization. The selection of appropriate procedures is dependent upon the samples encountered and personal preference. The following are presented as possible sample preparation steps.

A mortar and pestle can sometimes be used in the size reduction of soft or loosely bound materials though this may cause matting of some samples. Such samples may be reduced in a Wylie mill. Apparatus should be clean and extreme care exercised to avoid cross-contamination of samples. Periodic checks of the particle sizes should be made during the grinding operation so as to preserve any fiber bundles present in an identifiable form. These procedures are not recommended for samples that contain amphibole minerals or

vermiculite. Grinding of amphiboles may result in the separation of fiber bundles or the production of cleavage fragments with aspect ratios greater than 3:1. Grinding of vermiculite may also produce fragments with aspect ratios greater than 3:1.

Acid treatment may occasionally be required to eliminate interferences. Calcium carbonate, gypsum, and bassanite (plaster) are frequently present in sprayed or trowelled insulations. These materials may be removed by treatment with warm dilute acetic acid. Warm dilute hydrochloric acid may also be used to remove the above materials. If acid treatment is required, wash the sample at least twice with distilled water, being careful not to lose the particulates during decanting steps. Centrifugation or filtration of the suspension will prevent significant fiber loss. The pore size of the filter should be 0.45 micron or less. Caution: prolonged acid contact with the sample may alter the optical characteristics of chrysotile fibers and should be avoided.

Coatings and binding materials adhering to fiber surfaces may also be removed by treatment with sodium metaphosphate.[7] Add 10 mL of 10g/L sodium metaphosphate solution to a small (0.1 to 0.5 mL) sample of bulk material in a 15-mL glass centrifuge tube. For approximately 15 seconds each, stir the mixture on a vortex mixer, place in an ultrasonic bath and then shake by hand. Repeat the series. Collect the dispersed solids by centrifugation at 1000 rpm for 5 minutes. Wash the sample three times by suspending in 10 mL distilled water and recentrifuging. After washing, resuspend the pellet in 5 mL distilled water, place a drop of the suspension on a microscope slide, and dry the slide at 110 °C.

In samples with a large portion of cellulosic or other organic fibers, it may be useful to ash part of the sample and view the residue. Ashing should be performed in a low temperature asher. Ashing may also be performed in a muffle furnace at temperatures of 500 °C or lower. Temperatures of 550 °C or higher will cause dehydroxylation of the asbestos minerals, resulting in changes of the refractive index and other key parameters. If a muffle furnace is to be used, the furnace thermostat should be checked and calibrated to ensure that samples will not be heated at temperatures greater than 550 °C.

Ashing and acid treatment of samples should not be used as standard procedures. In order to monitor possible changes in fiber characteristics, the material should be viewed microscopically before and after any sample preparation procedure. Use of these procedures on samples to be used for quantitation requires a correction for percent weight loss.

1.7.2.3 Fiber Identification

Positive identification of asbestos requires the determination of the following optical properties.

- Morphology
- Color and pleochroism
- Refractive indices
- Birefringence
- Extinction characteristics
- Sign of elongation

Table 1–1 lists the above properties for commercial asbestos fibers. Figure 1–1 presents a flow diagram of the examination procedure. Natural variations in the conditions under which deposits of asbestiform minerals are formed will occasionally produce exceptions to the published values and differences from the UICC standards. The sign of elongation is determined by use of the compensator plate and crossed polars. Refractive indices may be determined by the Becke line test. Alternatively, dispersion staining may be used. Inexperienced operators may find that the dispersion staining technique is more easily learned, and should consult Reference 9 for guidance. Central stop dispersion staining colors are presented in Table 1–2. Available high-dispersion (HD) liquids should be used.

TABLE 1–1—OPTICAL PROPERTIES OF ASBESTOC FIBERS

Mineral	Morphology, color[a]	Refrac- tive indices[b]		Birefring- ence	Extinction	Sign of elonation
		α	γ			
Chrysotile (asbestiform serpentine).	Wavy fibers. Fiber bundles have splayed ends and "kinks". Aspect ratio typically >10:1. Colorless[3], nonpleochroic.	1.493–1.560	1.517–1.562[f] (normally 1.556).	.008	| to fiber length.	+ (length slow)
Amosite (asbestiform grunerite).	Straight, rigid fibers. Aspect ratio typically >10:1. Colorless to brown, nonpleochroic or weakly so. Opaque inclusions may be present.	1.635–1.696	1.655–1.729[f] (normally 1.696–1.710.	.020–.033	| to fiber length.	+ (length slow)

TABLE 1–1—OPTICAL PROPERTIES OF ASBESTOC FIBERS—Continued

Mineral	Morphology, color[a]	Refrac- tive indices[b]		Birefringence	Extinction	Sign of elonation
		α	γ			
Crocidolite (asbestiform Riebeckite).	Straight, rigid fibers. Thick fibers and bundles common, blue to purple-blue in color. Pleochroic. Birefringence is generally masked by blue color.	1.654–1.701	1.668–1.717[3e] (normally close to 1.700).	.014–.016	| to fiber length.	– (length fast)
Anthophyllite-asbestos.	Straight fibers and acicular cleavage fragments.[d] Some composite fibers. Aspect ratio <10:1. Colorless to light brown.	1.596–1.652	1.615–1.676[f].	.019–.024	| to fiber length.	+ (length slow)
Tremolite-actinolite-asbestos.	Normally present as acicular or prismatic cleavage fragments.[d] Single crystals predominate, aspect ratio <10:1. Colorless to pale green.	1.599–1.668	1.622–1.688[f].	.023–.020	Oblique extinction, 10–20° for fragments. Composite fibers show | extinction.	+ (length slow)

[a] From reference 5; colors cited are seen by observation with plane polarized light.
[b] From references 5 and 8.
[c] Fibers subjected to heating may be brownish.
[d] Fibers defined as having aspect ratio >3:1.
[e] to fiber length.
[f] |To fiber length.

Polarized light microscopy analysis: For each type of material identified by examination of sample at low magnification. Mount spacially dispersed sample in 1.550 RI liquid. (If using dispersion staining, mount in 1.550 HD.) View at 100X with both plane polarized light and crossed polars. More than one fiber type may be present.

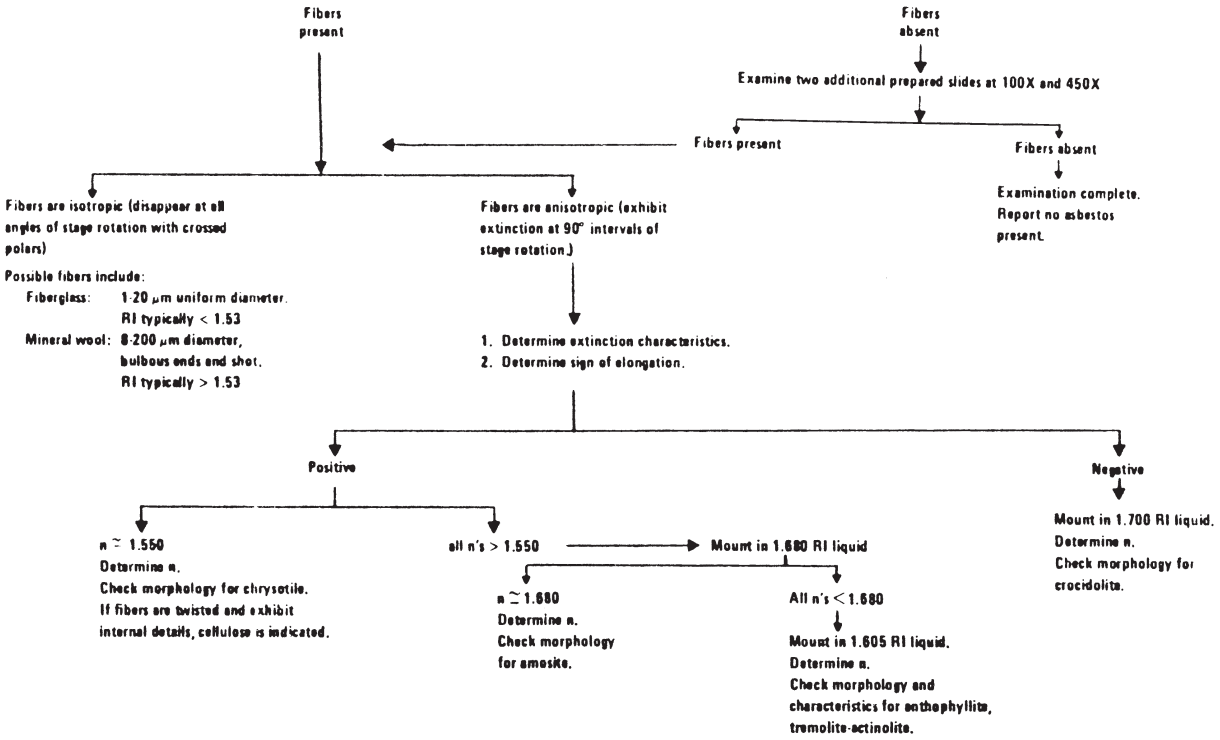


Figure 1-1. Flow chart for analysis of bulk samples by polarized light microscopy.

TABLE 1–2—CENTRAL STOP DISPERSION STAINING COLORS [A]

Mineral	RI Liquid	η	η|
Chrysotile	1.550 HD	Blue	Blue-magenta
Amosite	1.680	Blue-magenta to pale blue.	Golden-yellow
	1.550HD	Yellow to white.	Yellow to white
Crocidolite [b] ..	1.700	Red magenta	Blue-magenta
	1.550HD	Yellow to white.	Yellow to white
Anthophyllite	1.605HD	Blue	Gold to gold-magenta
Tremolite	1.605HD [c]	Pale blue	Gold
Actinolite	1.605HD	Gold-magenta to blue.	Gold
	1.630HD [c]	Magenta	Golden-yellow

[a] From reference 9.
[b] Blue absorption color.
[c] Oblique extinction view.

1.7.2.4 Quantitation of Asbestos Content

Asbestos quantitation is performed by a point-counting procedure or an equivalent estimation method. An ocular reticle (cross-hair or point array) is used to visually superimpose a point or points on the microscope field of view. Record the number of points positioned directly above each kind of particle or fiber of interest. Score only points directly over asbestos fibers or nonasbestos matrix material. Do not score empty points for the closest particle. If an asbestos fiber and a matrix particle overlap so that a point is superimposed on their visual intersection, a point is scored for both categories. Point counting provides a determination of the area percent asbestos. Reliable conversion of area percent to percent of dry weight is not currently feasible unless the specific gravities and relative volumes of the materials are known.

For the purpose of this method, ''asbestos fibers'' are defined as having an aspect ratio greater than 3:1 and being positively identified as one of the minerals in Table 1–1.

A total of 400 points superimposed on either asbestos fibers or nonasbestos matrix material must be counted over at least eight different preparations of representative subsamples. Take eight forcep samples and mount each separately with the appropriate refractive index liquid. The preparation should not be heavily loaded. The sample should be uniformly dispersed to avoid overlapping particles and allow 25–50 percent empty area within the fields of view. Count 50 nonempty points on each preparation, using either

- A cross-hair reticle and mechanical stage; or
- A reticle with 25 points (Chalkley Point Array) and counting at least 2 randomly selected fields.

For samples with mixtures of isotropic and anisotropic materials present, viewing the sample with slightly uncrossed polars or the addition of the compensator plate to the polarized light path will allow simultaneous discrimination of both particle types. Quantitation should be performed at 100X or at the lowest magnification of the polarized light microscope that can effectively distinguish the sample components. Confirmation of the quantitation result by a second analyst on some percentage of analyzed samples should be used as standard quality control procedure.

The percent asbestos is calculated as follows:

$$\% \text{ asbestos} = (a/n)\ 100\%$$

where

a=number of asbestos counts,

n=number of nonempty points counted (400).

If a=0, report ''No asbestos detected.'' If $0 < a \leq 3$, report ''<1% asbestos''.

The value reported should be rounded to the nearest percent.

1.8 References

1. Paul F. Kerr, *Optical Mineralogy*, 4th ed., New York, McGraw-Hill, 1977.

2. E. M. Chamot and C. W. Mason, *Handbook of Chemical Microscopy*, *Volume One*, 3rd ed., New York: John Wiley & Sons, 1958.

3. F. Chayes, *Petrographic Modal Analysis: An Elementary Statistical Appraisal*, New York: John Wiley & Sons, 1956.

4. E. P. Brantly, Jr., K. W. Gold, L. E. Myers, and D. E. Lentzen, *Bulk Sample Analysis for Asbestos Content: Evaluation of the Tentative Method*, U.S. Environmental Protection Agency, October 1981.

5. U.S. Environmental Protection Agency, *Asbestos-Containing Materials in School Buildings: A Guidance Document*, Parts 1 and 2, EPA/OPPT No. C00090, March 1979.

6. D. Lucas, T. Hartwell, and A. V. Rao, *Asbestos-Containing Materials in School Buildings: Guidance for Asbestos Analytical Programs*, EPA 560/13–80–017A, U.S. Environmental Protection Agency, December 1980, 96 pp.

7. D. H. Taylor and J. S. Bloom, Hexametaphosphate pretreatment of insulation samples for identification of fibrous constituents, *Microscope*, *28*, 1980.

8. W. J. Campbell, R. L. Blake, L. L. Brown, E. E. Cather, and J. J. Sjoberg. *Selected Silicate Minerals and Their Asbestiform Varieties: Mineralogical Definitions and Identification-Characterization*, U.S. Bureau of Mines Information Circular 8751, 1977.

9. Walter C. McCrone, *Asbestos Particle Atlas*, Ann Arbor: Ann Arbor Science Publishers, June 1980.

SECTION 2. X-RAY POWDER DIFFRACTION

2.1 Principle and Applicability

The principle of X-ray powder diffraction (XRD) analysis is well established.[1,2] Any solid, crystalline material will diffract an impingent beam of parallel, monochromatic X-rays whenever Bragg's Law,

$\lambda = 2d \sin \theta$,

is satisfied for a particular set of planes in the crystal lattice, where

λ = the X-ray wavelength, Å;
d = the interplanar spacing of the set of reflecting lattice planes, Å; and
θ = the angle of incidence between the X-ray beam and the reflecting lattice planes.

By appropriate orientation of a sample relative to the incident X-ray beam, a diffraction pattern can be generated that, in most cases, will be uniquely characteristic of both the chemical composition and structure of the crystalline phases present.

Unlike optical methods of analysis, however, XRD cannot determine crystal morphology. Therefore, in asbestos analysis, XRD does not distinguish between fibrous and nonfibrous forms of the serpentine and amphibole minerals (Table 2–1). However, when used in conjunction with optical methods such as polarized light microscopy (PLM), XRD techniques can provide a reliable analytical method for the identification and characterization of asbestiform minerals in bulk materials.

For *qualitative analysis* by XRD methods, samples are initially scanned over limited diagnostic peak regions for the serpentine (~7.4 Å) and amphibole (8.2–8.5 Å) minerals (Table 2–2). Standard slow-scanning methods for bulk sample analysis may be used for materials shown by PLM to contain significant amounts of asbestos (>5–10 percent). Detection of minor or trace amounts of asbestos may require special sample preparation and step-scanning analysis. All samples that exhibit diffraction peaks in the diagnostic regions for asbestiform minerals are submitted to a full (5°–60° 2θ; 1° 2θ/min) qualitative XRD scan, and their diffraction patterns are compared with standard reference powder diffraction patterns[3] to verify initial peak assignments and to identify possible matrix interferences when subsequent quantitative analysis will be performed.

TABLE 2–1—THE ASBESTOS MINERALS AND THEIR NONASBESTIFORM ANALOGS

Asbestiform	Nonasbestiform
SERPENTINE	
Chrysotile	Antigorite, lizardite
AMPHIBOLE	
Anthophyllite asbestos	Anthophyllite
Cummingtonite-grunerite asbestos ("Amosite")	Cummingtonite-grunerite
Crocidolite	Riebeckite
Tremolite asbestos	Tremolite
Actinolite asbestos	Actinolite

TABLE 2–2—PRINCIPAL LATTICE SPACINGS OF ASBESTIFORM MINERALS[A]

Minerals	Principal d-spacings (Å) and relative intensities			JCPDS Powder diffraction file[3] number
Chrysotile	7.37_{100}	3.65_{70}	4.57_{50}	21–543[b]
	7.36_{100} ..	3.66_{80}	2.45_{65}	25–645
	7.10_{100} ..	2.33_{80}	3.55_{70}	22–1162 (theoretical)
"Amosite"	8.33_{100}	3.06_{70}	2.756_{70}	17–745 (nonfibrous)
	8.22_{100} ..	3.060_{85}	3.25_{70}	27–1170 (UICC)
Anthophyllite	3.05_{100}	3.24_{60}	8.26_{55}	9–455
	3.06_{100} ..	8.33_{70}	3.23_{50}	16–401 (synthetic)
Anthophyllite	2.72_{100}	2.54_{100}	3.480_{80}	25–157
Crocidolite	8.35_{100}	3.10_{55}	2.720_{35}	27–1415 (UICC)
Tremolite	8.38_{100}	3.12_{100}	2.705_{90}	13–437[b]
	2.706_{100}	3.14_{95}	8.43_{40}	20–1310[b] (synthetic)
	3.13_{100} ..	2.706_{60}	8.44_{40}	23–666 (synthetic mixture with richterite)

[a] This information is intended as a guide, only. Complete powder diffraction data, including mineral type and source, should be referred to, to ensure comparability of sample and reference materials where possible. Additional precision XRD data on amosite, crocidolite, tremolite, and chrysotile are available from the U.S. Bureaus of Mines.[4]
[b] Fibrosity questionable.

Accurate *quantitative analysis* of asbestos in bulk samples by XRD is critically dependent on particle size distribution, crystallite size, preferred orientation and matrix absorption effects, and comparability of standard reference and sample materials. The most intense diffraction peak that has been shown to be free from interference by prior qualitative XRD analysis is selected for quantitation of each asbestiform mineral. A "thin-layer" method of analysis[5,6] is recommended in which, subsequent to comminution of the bulk material to ~10 μm by suitable cryogenic milling techniques, an accurately known amount of the sample is deposited on a silver membrane filter. The

mass of asbestiform material is determined by measuring the integrated area of the selected diffraction peak using a step-scanning mode, correcting for matrix absorption effects, and comparing with suitable calibration standards. Alternative ''thick-layer'' or bulk methods,[7,8] may be used for *semi-quantitative analysis.*

This XRD method is applicable as a confirmatory method for identification and quantitation of asbestos in bulk material samples that have undergone prior analysis by PLM or other optical methods.

2.2 Range and Sensitivity

The range of the method has not been determined.

The sensitivity of the method has not been determined. It will be variable and dependent upon many factors, including matrix effects (absoprtion and interferences), diagnostic reflections selected, and their relative intensities.

2.3 Limitations

2.3.1 Interferences

Since the fibrous and nonfibrous forms of the serpentine and amphibole minerals (Table 2–1) are indistinguishable by XRD techniques unless special sample preparation techniques and instrumentation are used,[9] the presence of nonasbestiform serpentines and amphiboles in a sample will pose severe interference problems in the identification and quantitative analysis of their asbestiform analogs.

The use of XRD for identification and quantitation of asbestiform minerals in bulk samples may also be limited by the presence of other interfering materials in the sample. For naturally occurring materials the commonly associated asbestos-related mineral interferences can usually be anticipated. However, for fabricated materials the nature of the interferences may vary greatly (Table 2–3) and present more serious problems in identification and quantitation.[10] Potential interferences are summarized in Table 2–4 and include the following:

- *Chlorite* has major peaks at 7.19 Å and 3.58 Å That interfere with both the primary (7.36 Å) and secondary (3.66 Å) peaks for chrysotile. Resolution of the primary peak to give good quantitative results may be possible when a step-scanning mode of operation is employed.
- *Halloysite* has a peak at 3.63 Å that interferes with the secondary (3.66 Å) peak for chrysotile.
- *Kaolinite* has a major peak at 7.15 Å that may interfere with the primary peak of chrysotile at 7.36 Å when present at concentrations of >10 percent. However, the secondary chrysotile peak at 3.66 Å may be used for quantitation.
- *Gypsum* has a major peak at 7.5 Å that overlaps the 7.36 Å peak of chrysotile when present as a major sample constituent. This may be removed by careful washing with distilled water, or be heating to 300 °C to convert gypsum to plaster of paris.
- *Cellulose* has a broad peak that partially overlaps the secondary (3.66 Å) chrysotile peak.[8]
- Overlap of major diagnostic peaks of the amphibole asbestos minerals, amosite, anthophyllite, crocidolite, and tremolite, at approximately 8.3 Å and 3.1 Å causes mutual interference when these minerals occur in the presence of one another. In some instances, adquate resolution may be attained by using step-scanning methods and/or by decreasing the collimator slit width at the X-ray port.

TABLE 2–3—COMMON CONSTITUENTS IN INSULATION AND WALL MATERIALS

A. Insulation materials
Chrysotile
''Amosite''
Crocidolite
*Rock wool
*Slag wool
*Fiber glass
Gypsum ($CaSO_4 \cdot 2H_2O$)
Vermiculite (micas)
*Perlite
Clays (kaolin)
*Wood pulp
*Paper fibers (talc, clay, carbonate fillers)
Calcium silicates (synthetic)
Opaques (chromite, magnetite inclusions in serpentine)
Hematite (inclusions in ''amosite'')
Magnesite
*Diatomaceous earth

B. Spray finishes or paints
Bassanite
Carbonate minerals (calcite, dolomite, vaterite)
Talc
Tremolite
Anthophyllite
Serpentine (including chrysotile)
Amosite
Crocidolite
*Mineral wool
*Rock wool
*Slag wool
*Fiber glass
Clays (kaolin)
Micas
Chlorite
Gypsum ($CaSO_4 \cdot 2H_2O$)
Quartz
*Organic binders and thickeners
Hyrdomagnesite
Wollastonite
Opaques (chromite, magnetite inclusions in serpentine)
Hematite (inclusions in ''amosite'')

*Amorphous materials contribute only to overall scattered radiation and increased background radiation.

TABLE 2–4—INTERFERENCES IN XRD ANALYSIS ASBESTIFORM MINERALS

Asbestiform mineral	Primary diagnostic peaks (approximate d-spacings, in Å)	Interference
Serpentine		
Chrysotile	7.4	Nonasbestiform serpentines (antigorite, lizardite)
		Chlorite
		Kaolinite
		Gypsum
	3.7	Chlorite
		Halloysite
		Cellulose
Amphibole		
"Amosite" Anthophyllite Crocidolite Tremolite	3.1	Nonasbestiform amphiboles (cummingtonite-grunerite, anthophyllite, riebeckite, tremolite)
		Mutual interferences
		Carbonates
		Talc
	8.3	Mutual interferences

- *Carbonates* may also interfere with quantitative analysis of the amphibole asbestos minerals, amosite, anthophyllite, crocidolite, and tremolite. Calcium carbonate ($CaCO_3$) has a peak at 3.035 Å that overlaps major amphibole peaks at approximately 3.1 Å when present in concentrations of >5 percent. Removal of carbonates with a dilute acid wash is possible; however, if present, chrysotile may be partially dissolved by this treatment.[11]
- A major *talc* peak at 3.12 Å interferes with the primary tremolite peak at this same position and with secondary peaks of crocidolite (3.10 Å), amosite (3.06 Å), and anthophyllite (3.05 Å). In the presence of talc, the major diagnostic peak at approximately 8.3 Å should be used for quantitation of these asbestiform minerals.

The problem of intraspecies and matrix interferences is further aggravated by the variability of the silicate mineral powder diffraction patterns themselves, which often makes definitive identification of the asbestos minerals by comparison with standard reference diffraction patterns difficult. This variability results from alterations in the crystal lattice associated with differences in isomorphous substitution and degree of crystallinity. This is especially true for the amphiboles. These minerals exhibit a wide variety of very similar chemical compositions, with the result being that their diffraction patterns are chracterized by having major (110) reflections of the monoclinic amphiboles and (210) reflections of the orthorhombic anthophyllite separated by less than 0.2 Å.[12]

2.3.2 Matrix Effects

If a copper X-ray source is used, the presence of iron at high concentrations in a sample will result in significant X-ray fluorescence, leading to loss of peak intensity along with increased background intensity and an overall decrease in sensitivity. This situation may be corrected by choosing an X-ray source other than copper; however, this is often accompanied both by loss of intensity and by decreased resolution of closely spaced reflections. Alternatively, use of a diffracted beam monochromator will reduce background fluorescent raditation, enabling weaker diffraction peaks to be detected.

X-ray absorption by the sample matrix will result in overall attenuation of the diffracted beam and may seriously interfere with quantitative analysis. Absorption effects may be minimized by using sufficiently "thin" samples for analysis.[5,13,14] However, unless absorption effects are known to be the same for both samples and standards, appropriate corrections should be made by referencing diagnostic peak areas to an internal standard[7,8] or filter substrate (Ag) peak.[5,6]

2.3.3 Particle Size Dependence

Because the intensity of diffracted X-radiation is particle-size dependent, it is essential for accurate quantitative analysis that both sample and standard reference materials have similar particle size distributions. The optimum particle size range for quantitative analysis of asbestos by XRD has been reported to be 1 to 10 μm.[15] Comparability of sample and standard reference material particle size distributions should be verified by optical microscopy (or another suitable method) prior to analysis.

2.3.4 Preferred Orientation Effects

Preferred orientation of asbestiform minerals during sample preparation often poses a serious problem in quantitative analysis by XRD. A number of techniques have been developed for reducing preferred orientation effects in "thick layer" samples.[7,8,15] However, for "thin" samples on membrane filters, the preferred orientation effects seem to be both reproducible and favorable to enhancement of the principal diagnostic reflections of asbestos minerals, actually increasing the overall sensitivity of the method.[12,14] (Further investigation into preferred orientation effects in both thin layer and bulk samples is required.)

2.3.5 Lack of Suitably Characterized Standard Materials

The problem of obtaining and characterizing suitable reference materials for asbestos analysis is clearly recognized. NIOSH has

recently directed a major research effort toward the preparation and characterization of analytical reference materials, including asbestos standards;[16,17] however, these are not available in large quantities for routine analysis.

In addition, the problem of ensuring the comparability of standard reference and sample materials, particularly regarding crystallite size, particle size distribution, and degree of crystallinity, has yet to be adequately addressed. For example, Langer et al.[18] have observed that in insulating matrices, chrysotile tends to break open into bundles more frequently than amphiboles. This results in a line-broadening effect with a resultant decrease in sensitivity. Unless this effect is the same for both standard and sample materials, the amount of chrysotile in the sample will be underestimated by XRD analysis. To minimize this problem, it is recommended that standardized matrix reduction procedures be used for both sample and standard materials.

2.4 Precision and Accuracy

Precision of the method has not been determined.

Accuracy of the method has not been determined.

2.5 Apparatus

2.5.1 Sample Preparation

Sample preparation apparatus requirements will depend upon the sample type under consideration and the kind of XRD analysis to be performed.

- *Mortar and Pestle:* Agate or porcelain.
- *Razor Blades*
- *Sample Mill:* SPEX, Inc., freezer mill or equivalent.
- *Bulk Sample Holders*
- *Silver Membrane Filters:* 25-mm diameter, 0.45-μm pore size. Selas Corp. of America, Flotronics Div., 1957 Pioneer Road, Huntington Valley, PA 19006.
- *Microscope Slides*
- *Vacuum Filtration Apparatus:* Gelman No. 1107 or equivalent, and side-arm vacuum flask.
- *Microbalance*
- *Ultrasonic Bath or Probe:* Model W140, Ultrasonics, Inc., operated at a power density of approximately 0.1 W/mL, or equivalent.
- *Volumetric Flasks:* 1–L volume.
- *Assorted Pipettes*
- *Pipette Bulb*
- *Nonserrated Forceps*
- *Polyethylene Wash Bottle*
- *Pyrex Beakers:* 50-mL volume.
- *Desiccator*
- *Filter Storage Cassettes*
- *Magnetic Stirring Plate and Bars*
- *Porcelain Crucibles*
- *Muffle Furnace or Low Temperature Asher*

2.5.2 Sample Analysis

Sample analysis requirements include an X-ray diffraction unit, equipped with:

- *Constant Potential Generator; Voltage and mA Stabilizers*
- *Automated Diffractometer with Step-Scanning Mode*
- *Copper Target X-Ray Tube:* High intensity, fine focus, preferably.
- *X-Ray Pulse Height Selector*
- *X-Ray Detector* (with high voltage power supply): Scintillation or proportional counter.
- *Focusing Graphite Crystal Monochromator;* or *Nickel Filter* (if copper source is used, and iron fluorescence is not a serious problem).
- *Data Output Accessories:*
  - *Strip Chart Recorder*
  - *Decade Scaler/Timer*
  - *Digital Printer*
- *Sample Spinner* (optional).
- *Instrument Calibration Reference Specimen:* α-quartz reference crystal (Arkansas quartz standard, #180–147–00, Philips Electronics Instruments, Inc., 85 McKee Drive, Mahwah, NJ 07430) or equivalent.

2.6 Reagents

2.6.1 Standard Reference Materials

The reference materials listed below are intended to serve as a guide. Every attempt should be made to acquire pure reference materials that are comparable to sample materials being analyzed.

- *Chrysotile:* UICC Canadian, or NIEHS Plastibest. (UICC reference materials available from: UICC, MRC Pneumoconiosis Unit, Llandough Hospital, Penarth, Glamorgan, CF61XW, UK).
- *Crocidolite:* UICC
- *Amosite:* UICC
- *Anthophyllite:* UICC
- *Tremolite Asbestos:* Wards Natural Science Establishment, Rochester, N.Y.; Cyprus Research Standard, Cyprus Research, 2435 Military Ave., Los Angeles, CA 90064 (washed with dilute HCl to remove small amount of calcite impurity); India tremolite, Rajasthan State, India.
- *Actinolite Asbestos*

2.6.2 Adhesive

Tape, petroleum jelly, etc. (for attaching silver membrane filters to sample holders).

2.6.3 Surfactant

1 percent aerosol OT aqueous solution or equivalent.

2.6.4 Isopropanol

ACS Reagent Grade.

2.7 Procedure

2.7.1 Sampling

Samples for analysis of asbestos content shall be collected as specified in EPA Guidance Document #C0090, *Asbestos-Containing Materials in School Buildings*.[10]

2.7.2 Analysis

All samples must be analyzed initially for asbestos content by PLM. XRD should be used as an auxiliary method when a second, independent analysis is requested.

NOTE: Asbestos is a toxic substance. All handling of dry materials should be performed in an operating fume hood.

2.7.2.1 Sample Preparation

The method of sample preparation required for XRD analysis will depend on: (1) The condition of the sample received (sample size, homogeneity, particle size distribution, and overall composition as determined by PLM); and (2) the type of XRD analysis to be performed (qualitative, quantitative, thin layer or bulk).

Bulk materials are usually received as inhomogeneous mixtures of complex composition with very wide particle size distributions. Preparation of a homogeneous, representative sample from asbestos-containing materials is particularly difficult because the fibrous nature of the asbestos minerals inhibits mechanical mixing and stirring, and because milling procedures may cause adverse lattice alterations.

A discussion of specific matrix reduction procedures is given below. Complete methods of sample preparation are detailed in Sections 2.7.2.2 and 2.7.2.3.

NOTE: All samples should be examined microscopically before and after each matrix reduction step to monitor changes in sample particle size, composition, and crystallinity, and to ensure sample representativeness and homogeneity for analysis.

2.7.2.1.1 *Milling*— Mechanical milling of asbestos materials has been shown to decrease fiber crystallinity, with a resultant decrease in diffraction intensity of the specimen; the degree of lattice alteration is related to the duration and type of milling process.[19,22] Therefore, all milling times should be kept to a minimum.

For *qualitative analysis,* particle size is not usually of critical importance and initial characterization of the material with a minimum of matrix reduction is often desirable to document the composition of the sample as received. Bulk samples of very large particle size (>2–3 mm) should be comminuted to ~100 μm. A mortar and pestle can sometimes be used in size reduction of soft or loosely bound materials though this may cause matting of some samples. Such samples may be reduced by cutting with a razor blade in a mortar, or by grinding in a suitable mill (e.g., a microhammer mill or equivalent). When using a mortar for grinding or cutting, the sample should be moistened with ethanol, or some other suitable wetting agent, to minimize exposures.

For accurate, reproducible *quantitative analysis,* the particle size of both sample and standard materials should be reduced to ~10 μm (see Section 2.3.3). Dry ball milling at liquid nitrogen temperatures (e.g., Spex Freezer Mill, or equivalent) for a maximum time of 10 min. is recommended to obtain satisfactory particle size distributions while protecting the integrity of the crystal lattice.[5] Bulk samples of very large particle size may require grinding in two stages for full matrix reduction to <10 μm.[8,16]

Final particle size distributions should always be verified by optical microscopy or another suitable method.

2.7.2.1.2 *Low temperature ashing*—For materials shown by PLM to contain large amounts of gypsum, cellulosic, or other organic materials, it may be desirable to ash the samples prior to analysis to reduce background radiation or matrix interference. Since chrysotile undergoes dehydroxylation at temperatures between 550 °C and 650 °C, with subsequent transformation to forsterite,[23,24] ashing temperatures should be kept below 500 °C. Use of a low temperature asher is recommended. In all cases, calibration of the oven is essential to ensure that a maximum ashing temperature of 500 °C is not exceeded.

2.7.2.1.3 *Acid leaching*—Because of the interference caused by gypsum and some carbonates in the detection of asbestiform minerals by XRD (see Section 2.3.1), it may be necessary to remove these interferents by a simple acid leaching procedure prior to analysis (see Section 1.7.2.2).

2.7.2.2 Qualitative Analysis

2.7.2.2.1 *Initial screening of bulk material*— Qualitative analysis should be performed on a representative, homogeneous portion of the sample with a minimum of sample treatment.

1. Grind and mix the sample with a mortar and pestle (or equivalent method, see Section 2.7.2.1.1.) to a final particle size sufficiently small (~100 μm) to allow adequate packing into the sample holder.

2. Pack the sample into a standard bulk sample holder. Care should be taken to ensure that a representative portion of the milled sample is selected for analysis. Particular care should be taken to avoid possible size segregation of the sample. (Note: Use of a back-packing method[25] of bulk sample preparation may reduce preferred orientation effects.)

3. Mount the sample on the diffractometer and scan over the diagnostic peak regions for

the serpentine (~67.4 Å) and amphibole (8.2–8.5 Å) minerals (see Table 2–2). The X-ray diffraction equipment should be optimized for intensity. A slow scanning speed of 1° 2θ/min is recommended for adequate resolution. Use of a sample spinner is recommended.

4. Submit all samples that exhibit diffraction peaks in the diagnostic regions for asbestiform minerals to a full qualitative XRD scan (5°–60° 2θ; 1°2θ/min) to verify initial peak assignments and to identify potential matrix interferences when subsequent quantitative analysis is to be performed.

5. Compare the sample XRD pattern with standard reference powder diffraction patterns (i.e., JCPDS powder diffraction data[3] or those of other well-characterized reference materials). Principal lattice spacings of asbestiform minerals are given in Table 2–2; common constituents of bulk insulation and wall materials are listed in Table 2–3.

2.7.2.2.2 *Detection of minor or trace constituents*— Routine screening of bulk materials by XRD may fail to detect small concentrations (<5 percent) of asbestos. The limits of detection will, in general, be improved if matrix absorption effects are minimized, and if the sample particle size is reduced to the optimal 1 to 10 μm range, provided that the crystal lattice is not degraded in the milling process. Therefore, in those instances where confirmation of the presence of an asbestiform mineral at very low levels is required, or where a negative result from initial screening of the bulk material by XRD (see Section 2.7.2.2.1) is in conflict with previous PLM results, it may be desirable to prepare the sample as described for quantitative analysis (see Section 2.7.2.3) and step-scan over appropriate 2θ ranges of selected diagnostic peaks (Table 2–2). Accurate transfer of the sample to the silver membrane filter is not necessary unless subsequent quantitative analysis is to be performed.

2.7.2.3 Quantitative Analysis

The proposed method for quantitation of asbestos in bulk samples is a modification of the NIOSH-recommended thin-layer method for chrysotile in air.[5] A thick-layer or bulk method involving pelletizing the sample may be used for semiquantitative analysis;[7,8] however, this method requires the addition of an internal standard, use of a specially fabricated sample press, and relatively large amounts of standard reference materials. Additional research is required to evaluate the comparability of thin- and thick-layer methods for quantitative asbestos analysis.

For quantitative analysis by thin-layer methods, the following procedure is recommended:

1. Mill and size all or a substantial representative portion of the sample as outlined in Section 2.7.2.1.1.

2. Dry at 100 °C for 2 hr; cool in a desiccator.

3. Weigh accurately to the nearest 0.01 mg.

4. Samples shown by PLM to contain large amounts of cellulosic or other organic materials, gypsum, or carbonates, should be submitted to appropriate matrix reduction procedures described in Sections 2.7.2.1.2 and 2.7.2.1.3. After ashing and/or acid treatment, repeat the drying and weighing procedures described above, and determine the percent weight loss; L.

5. Quantitatively transfer an accurately weighed amount (50–100 mg) of the sample to a 1–L volumetric flask with approximately 200 mL isopropanol to which 3 to 4 drops of surfactant have been added.

6. Ultrasonicate for 10 min at a power density of approximately 0.1 W/mL, to disperse the sample material.

7. Dilute to volume with isopropanol.

8. Place flask on a magnetic stirring plate. Stir.

9. Place a silver membrane filter on the filtration apparatus, apply a vacuum, and attach the reservoir. Release the vacuum and add several milliliters of isopropanol to the reservoir. Vigorously hand shake the asbestos suspension and immediately withdraw an aliquot from the center of the suspension so that total sample weight, W_T, on the filter will be approximately 1 mg. Do not adjust the volume in the pipet by expelling part of the suspension; if more than the desired aliquot is withdrawn, discard the aliquot and resume the procedure with a clean pipet. Transfer the aliquot to the reservoir. Filter rapidly under vacuum. Do not wash the reservoir walls. Leave the filter apparatus under vacuum until dry. Remove the reservoir, release the vacuum, and remove the filter with forceps. (Note: Water-soluble matrix interferences such as gypsum may be removed at this time by careful washing of the filtrate with distilled water. Extreme care should be taken not to disturb the sample.)

10. Attach the filter to a flat holder with a suitable adhesive and place on the diffractometer. Use of a sample spinner is recommended.

11. For each asbestos mineral to be quantitated select a reflection (or reflections) that has been shown to be free from interferences by prior PLM or qualitative XRD analysis and that can be used unambiguously as an index of the amount of material present in the sample (see Table 2–2).

12. Analyze the selected diagnostic reflection(s) by step scanning in increments of 0.02° 2θ for an appropriate fixed time and integrating the counts. (A fixed count scan may be used alternatively; however, the method chosen should be used consistently for all samples and standards.) An appropriate scanning interval should be selected for each peak, and background corrections made. For a fixed time scan, measure the

background on each side of the peak for one-half the peak-scanning time. The net intensity, I_a, is the difference between the peak integrated count and the total background count.

13. Determine the net count, I_{Ag}, of the filter 2.36 Å silver peak following the procedure in step 12. Remove the filter from the holder, reverse it, and reattach it to the holder. Determine the net count for the unattenuated silver peak, $I_{\mathring{A}g}$. Scan times may be *less* for measurement of silver peaks than for sample peaks; however, they should be *constant* throughout the analysis.

14. Normalize all raw, net intensities (to correct for instrument instabilities) by referencing them to an external standard (e.g., the 3.34 Å peak of an α-quartz reference crystal). After each unknown is scanned, determine the net count, I_r, of the reference specimen following the procedure in step 12. Determine the normalized intensities by dividing the peak intensities by I_r:

$$\hat{I}_a = \frac{I_a}{I^\circ_r}, \quad \hat{I}_{Ag} = \frac{I_{Ag}}{I^\circ_r}, \text{ and } \hat{I}^\circ_{Ag} = \frac{I^\circ_{Ag}}{I^\circ_r}$$

2.8 Calibration

2.8.1 Preparation of Calibration Standards

1. Mill and size standard asbestos materials according to the procedure outlined in Section 2.7.2.1.1. *Equivalent, standardized matrix reduction and sizing techniques should be used for both standard and sample materials.*

2. Dry at 100 °C for 2 hr; cool in a desiccator.

3. Prepare two suspensions of each standard in isopropanol by weighing approximately 10 and 50 mg of the dry material to the nearest 0.01 mg. Quantitatively transfer each to a 1–L volumetric flask with approximately 200 mL isopropanol to which a few drops of surfactant have been added.

4. Ultrasonicate for 10 min at a power density of approximately 0.1 W/mL, to disperse the asbestos material.

5. Dilute to volume with isopropanol.

6. Place the flask on a magnetic stirring plate. Stir.

7. Prepare, in triplicate, a series of at least five standard filters to cover the desired analytical range, using appropriate aliquots of the 10 and 50 mg/L suspensions and the following procedure.

Mount a silver membrane filter on the filtration apparatus. Place a few milliliters of isopropanol in the reservoir. Vigorously hand shake the asbestos suspension and immediately withdraw an aliquot from the center of the suspension. Do not adjust the volume in the pipet by expelling part of the suspension; if more than the desired aliquot is withdrawn, discard the aliquot and resume the procedure with a clean pipet. Transfer the aliquot to the reservoir. Keep the tip of the pipet near the surface of the isopropanol. Filter rapidly under vacuum. Do not wash the sides of the reservoir. Leave the vacuum on for a time sufficient to dry the filter. Release the vacuum and remove the filter with forceps.

2.8.2 Analysis of Calibration Standards

1. Mount each filter on a flat holder. Perform step scans on selected diagnostic reflections of the standards and reference specimen using the procedure outlined in Section 2.7.2.3, step 12, and the same conditions as those used for the samples.

2. Determine the normalized intensity for each peak measured, $\hat{I}_{std}$, as outlined in Section 2.7.2.3, step 14.

2.9 Calculations

For each asbestos reference material, calculate the exact weight deposited on each standard filter from the concentrations of the standard suspensions and aliquot volumes. Record the weight, w, of each standard. Prepare a calibration curve by regressing $\hat{I}2_{std}$ on w. Poor reproducibility (±15 percent RSD) at any given level indicates problems in the sample preparation technique, and a need for new standards. The data should fit a straight line equation.

Determine the slope, m, of the calibration curve in counts/microgram. The intercept, b, of the line with the $\hat{I}_{std}$ axis should be approximately zero. A large negative intercept indicates an error in determining the background. This may arise from incorrectly measuring the baseline or from interference by another phase at the angle of background measurement. A large positive intercept indicates an error in determining the baseline or that an impurity is included in the measured peak.

Using the normalized intensity, $\hat{I}_{Ag}$, for the attenuated silver peak of a sample, and the corresponding normalized intensity from the unattenuated silver peak, $\hat{I}_{\mathring{A}g}$, of the sample filter, calculate the transmittance, T, for each sample as follows:[26,27]

$$T = \frac{\hat{I}_{Ag}}{\hat{I}^\circ_{Ag}}$$

Determine the correction factor, f(T), for each sample according to the formula:

$$f(T) = \frac{-R\,(\ln T)}{1-T^R}$$

where

$$R = \frac{\sin \Theta_{Ag}}{\sin \Theta_a}$$

θ_{Ag}=angular position of the measured silver peak (from Bragg's Law), and

θ_a=angular position of the diagnostic asbestos peak.

Calculate the weight, W_a, in micrograms, of the asbestos material analyzed for in each sample, using the appropriate calibration data and absorption corrections:

$$W_a = \frac{\hat{I}_a f(t) - b}{m}$$

Calculate the percent composition, P_a, of each asbestos mineral analyzed for in the parent material, from the total sample weight, W_T, on the filter:

$$P_a = \frac{W_a(1-.01L)}{W_T} \times 100$$

where

P_a=percent asbestos mineral in parent material;

W_a=mass of asbestos mineral on filter, in μg;

W_T=total sample weight on filter, in μg;

L=percent weight loss of parent material on ashing and/or acid treatment (see Section 2.7.2.3).

2.10 References

1. H. P. Klug and L. E. Alexander, *X-ray Diffraction Procedures for Polycrystalline and Amorphous Materials*, 2nd ed., New York: John Wiley and Sons, 1979.

2. L. V. Azaroff and M. J. Buerger, *The Powder Method of X-ray Crystallography*, New York: McGraw-Hill, 1958.

3. *JCPDS-International Center for Diffraction Data Powder Diffraction File*, U.S. Department of Commerce, National Bureau of Standards, and Joint Committee on Powder Diffraction Studies, Swarthmore, PA.

4. W. J. Campbell, C. W. Huggins, and A. G. Wylie, *Chemical and Physical Characterization of Amosite, Chrysotile, Crocidolite, and Nonfibrous Tremolite for National Institute of Environmental Health Sciences Oral Ingestion Studies*, U.S. Bureau of Mines Report of Investigation RI8452, 1980.

5. B. A. Lange and J. C. Haartz, Determination of microgram quantities of asbestos by X-ray diffraction: Chrysotile in thin dust layers of matrix material, *Anal. Chem.*, *51*(4):520–525, 1979.

6. *NIOSH Manual of Analytical Methods*, Volume 5, U.S. Dept. HEW, August 1979, pp. 309–1 to 309–9.

7. H. Dunn and J. H. Stewart, Jr., Quantitative determination of chrysotile in building materials, *The Microscope*, *29*(1), 1981.

8. M. Taylor, Methods for the quantitative determination of asbestos and quartz in bulk samples using X-ray diffraction, *The Analyst*, *103*(1231):1009–1020, 1978.

9. L. Birks, M. Fatemi, J. V. Gilfrich, and E. T. Johnson, *Quantitative Analysis of Airborne Asbestos by X-ray Diffraction*, Naval Research Laboratory Report 7879, Naval Research Laboratory, Washington, DC, 1975.

10. U.S. Environmental Protection Agency, *Asbestos-Containing Materials in School Buildings: A Guidance Document*, Parts 1 and 2, EPA/OPPT No. C00090, March 1979.

11. J. B. Krause and W. H. Ashton, Misidentification of asbestos in talc, pp. 339–353, in: *Proceedings of Workshop on Asbestos: Definitions and Measurement Methods* (NBS Special Publication 506), C. C. Gravatt, P. D. LaFleur, and K. F. Heinrich (eds.), Washington, DC: National Measurement Laboratory, National Bureau of Standards, 1977 (issued 1978).

12. H. D. Stanley, The detection and identification of asbestos and asbesti-form minerals in talc, pp. 325–337, *in Proceedings of Workshop on Asbestos: Definitions and Measurement Methods* (NBS Special Publication 506), C. C. Gravatt, P. D. LaFleur, and K. F. Heinrich (eds.), Washington, DC, National Measurement Laboratory, National Bureau of Standards, 1977 (issued 1978).

13. A. L. Rickards, Estimation of trace amounts of chrysotile asbestos by X-ray diffraction, *Anal. Chem.*, *44*(11):1872–3, 1972.

14. P. M. Cook, P. L. Smith, and D. G. Wilson, Amphibole fiber concentration and determination for a series of community air samples: use of X-ray diffraction to supplement electron microscope analysis, in: *Electron Microscopy and X-ray Applications to Environmental and Occupation Health Analysis*, P. A. Russell and A. E. Hutchings (eds.), Ann Arbor: Ann Arbor Science Publications, 1977.

15. A. N. Rohl and A. M. Langer, Identification and quantitation of asbestos in talc, *Environ. Health Perspectives*, *9*:95–109, 1974.

16. J. L. Graf, P. K. Ase, and R. G. Draftz, *Preparation and Characterization of Analytical Reference Minerals*, DHEW (NIOSH) Publication No. 79–139, June 1979.

17. J. C. Haartz, B. A. Lange, R. G. Draftz, and R. F. Scholl, Selection and characterization of fibrous and nonfibrous amphiboles for analytical methods development, pp. 295–312, in: *Proceedings of Workshop on Asbestos: Definitions and Measurement Methods* (NBS Special Publication 506), C. C. Gravatt, P. D. LaFleur, and K. F. Heinrich (eds.), Washington, DC: National Measurement Laboratory, National Bureau of Standards, 1977 (issued 1978).

18. Personal communication, A. M. Langer, Environmental Sciences Laboratory, Mount

Sinai School of Medicine of the City University of New York, New York, New York.

19. A. M. Langer, M. S. Wolff, A. N. Rohl, and I. J. Selikoff, Variation of properties of chrysotile asbestos subjected to milling, *J. Toxicol. and Environ. Health, 4:*173–188, 1978.

20. A. M. Langer, A. D. Mackler, and F. D. Pooley, Electron microscopical investigation of asbestos fibers, *Environ. Health Perspect., 9:*63–80, 1974.

21. E. Occella and G. Maddalon, X-ray diffraction characteristics of some types of asbestos in relation to different techniques of comminution, *Med. Lavoro, 54*(10):628–636, 1963.

22. K. R. Spurny, W. Stöber, H. Opiela, and G. Weiss, On the problem of milling and ultrasonic treatment of asbestos and glass fibers in biological and analytical applications, *Am. Ind. Hyg. Assoc. J., 41:*198–203, 1980.

23. L. G. Berry and B. Mason, *Mineralogy,* San Francisco: W. H. Greeman & Co., 1959.

24. J. P. Schelz, The detection of chrysotile asbestos at low levels in talc by differential thermal analysis, *Thermochimica Acta, 8:*197–204, 1974.

25. Reference 1, pp. 372–374.

26. J. Leroux, *Staub-Reinhalt Luft, 29:*26 (English), 1969.

27. J. A. Leroux, B. C. Davey, and A. Paillard, *Am. Ind. Hyg. Assoc. J., 34:*409, 1973.

[47 FR 23369, May 27, 1982; 47 FR 38535, Sept. 1, 1982; Redesignated at 60 FR 31922, June 19, 1995]

Subpart F [Reserved]

Subpart G—Asbestos Worker Protection

SOURCE: 65 FR 69216, Nov. 15, 2000, unless otherwise noted.

§ 763.120 What is the purpose of this subpart?

This subpart protects certain State and local government employees who are not protected by the Asbestos Standards of the Occupational Safety and Health Administration (OSHA). This subpart applies the OSHA Asbestos Standards in 29 CFR 1910.1001 and 29 CFR 1926.1101 to these employees.

§ 763.121 Does this subpart apply to me?

If you are a State or local government employer and you are not subject to a State asbestos standard that OSHA has approved under section 18 of the Occupational Safety and Health Act or a State asbestos plan that EPA has exempted from the requirements of this subpart under § 763.123, you must follow the requirements of this subpart to protect your employees from occupational exposure to asbestos.

§ 763.122 What does this subpart require me to do?

If you are a State or local government employer whose employees perform:

(a) Construction activities identified in 29 CFR 1926.1101(a), you must:

(1) Comply with the OSHA standards in 29 CFR 1926.1101.

(2) Submit notifications required for alternative control methods to the Director, National Program Chemicals Division (7404), Office of Pollution Prevention and Toxics, Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460.

(b) Custodial activities not associated with the construction activities identified in 29 CFR 1926.1101(a), you must comply with the OSHA standards in 29 CFR 1910.1001.

(c) Repair, cleaning, or replacement of asbestos-containing clutch plates and brake pads, shoes, and linings, or removal of asbestos-containing residue from brake drums or clutch housings, you must comply with the OSHA standards in 29 CFR 1910.1001.

§ 763.123 May a State implement its own asbestos worker protection plan?

This section describes the process under which a State may be exempted from the requirements of this subpart.

(a) *States seeking an exemption.* If your State wishes to implement its own asbestos worker protection plan, rather than complying with the requirements of this subpart, your State must apply for and receive an exemption from EPA.

(1) *What must my State do to apply for an exemption?* To apply for an exemption from the requirements of this subpart, your State must send to the Director of EPA's Office of Pollution Prevention and Toxics (OPPT) a copy of its asbestos worker protection regulations and a detailed explanation of how your State's asbestos worker protection plan meets the requirements of TSCA section 18 (15 U.S.C. 2617).

be comparable with contamination/background levels of blank filters. The decision is based, in part, on Poisson statistics which indicate that four structures must be counted on a filter before the fiber count is statistically distinguishable from the count for one structure. As more information on the performance of the method is collected, this criterion may be modified. Since different combinations of the number and size of grid openings are permitted under the TEM protocol, the criterion is expressed in structures per square millimeter of filter to be consistent across all combinations. Four structures per 10 grid openings corresponds to approximately 70 s/mm².

B. Sample Collection and Analysis

1. A minimum of 13 samples is required: five samples collected inside the abatement area, five samples collected outside the abatement area, two field blanks, and one sealed blank.

2. Sampling and TEM analysis must be done according to either the mandatory or nonmandatory protocols in Appendix A. At least 0.057 mm² of filter must be examined on blank filters.

C. Interpretation of Results

1. The response action shall be considered complete if either:

a. Each sample collected inside the abatement area consists of at least 1,199 L of air for a 25 mm filter, or 2,799 L of air for a 37 mm filter, and the arithmetic mean of their asbestos structure concentrations per square millimeter of filter is less than or equal to 70 s/mm²; or

b. The three blank samples have an arithmetic mean of the asbestos structure concentration on the blank filters that is less than or equal to 70 s/mm² and the average airborne asbestos concentration measured inside the abatement area is not statistically higher than the average airborne asbestos concentration measured outside the abatement area as determined by the Z-test. The Z-test is carried out by calculating

$$Z = \frac{\bar{Y}_I - \bar{Y}_O}{0.8(1/n_I + 1/n_O)^{1/2}}$$

where $\bar{Y}_I$ is the average of the natural logarithms of the inside samples and $\bar{Y}_O$ is the average of the natural logarithms of the outside samples, n_i is the number of inside samples and n_o is the number of outside samples. The response action is considered complete if Z is less than or equal to 1.65.

(Note.—When no fibers are counted, the calculated detection limit for that analysis is inserted for the concentration.)

2. If the abatement site does not satisfy either (1) or (2) above, the site must be recleaned and a new set of samples collected.

D. Sequence for Analyzing Samples

It is possible to determine completion of the response action without analyzing all samples. Also, at any point in the process, a decision may be made to terminate the analysis of existing samples, reclean the abatement site, and collect a new set of samples. The following sequence is outlined to minimize the number of analyses needed to reach a decision.

1. Analyze the inside samples.

2. If at least 1,199 L of air for a 25 mm filter or 2,799 L of air for a 37 mm filter is collected for each inside sample and the arithmetic mean concentration of structures per square millimeter of filter is less than or equal to 70 s/mm², the response action is complete and no further analysis is needed.

3. If less than 1,199 L of air for a 25 mm filter or 2,799 L of air for a 37 mm filter is collected for any of the inside samples, or the arithmetic mean concentration of structures per square millimeter of filter is greater than 70 s/mm², analyze the three blanks.

4. If the arithmetic mean concentration of structures per square millimeter on the blank filters is greater than 70 s/mm², terminate the analysis, identify and correct the source of blank contamination, and collect a new set of samples.

5. If the arithmetic mean concentration of structures per square millimeter on the blank filters is less than or equal to 70 s/mm², analyze the outside samples and perform the Z-test.

6. If the Z-statistic is less than or equal to 1.65, the response action is complete. If the Z-statistic is greater than 1.65, reclean the abatement site and collect a new set of samples.

Appendix B to Subpart E—Work Practices and Engineering Controls for Small-Scale, Short-Duration Operations Maintenance and Repair (O&M) Activities Involving ACM

This appendix is not mandatory, in that LEAs may choose to comply with all the requirements of 40 CFR 763.121. Section 763.91(b) extends the protection provided by EPA in its 40 CFR 763.121 for worker protection during asbestos abatement projects to employees of local education agencies who perform small-scale, short-duration operations, maintenance and repair (O&M) activities involving asbestos-containing materials and are not covered by the OSHA asbestos construction standard at 29 CFR 1926.58 or an asbestos worker protection standard adopted by a State as part of a State plan approved by OSHA under section 18 of the Occupational Safety and Health Act. Employers wishing to be exempt from the requirements of § 763.121 (e)(6) and (f)(2)(i) may instead comply with the provisions of this appendix when performing small-scale, short-duration O&M activities.

Definition of Small-Scale, Short-Duration Activities

For the purposes of this appendix, small-scale, short-duration maintenance activities are tasks such as, but not limited to:

1. Removal of asbestos-containing insulation on pipes.

2. Removal of small quantities of asbestos-containing insulation on beams or above ceilings.

3. Replacement of an asbestos-containing gasket on a valve.

4. Installation or removal of a small section of drywall.

5. Installation of electrical conduits through or proximate to asbestos-containing materials.

Small-scale, short-duration maintenance activities can be further defined, for the purposes of this subpart, by the following considerations:

1. Removal of small quantities of asbestos-containing materials (ACM) only if required in the performance of another maintenance activity not intended as asbestos abatement.

2. Removal of asbestos-containinge thermal system insulation not to exceed amounts greater than those which can be contained in a single glove bag.

3. Minor repairs to damaged thermal system insulation which do not require removal.

4. Repairs to a piece of asbestos-containing wallboard.

5. Repairs, involving encapsulation, enclosure or removal, to small amounts of friable asbestos-containing material only if required in the performance of emergency or routine maintenance activity and not intended solely as asbestos abatement. Such work may not exceed amounts greater than those which can be contained in a single prefabricated minienclosure. Such an enclosure shall conform spatially and geometrically to the localized work area, in order to perform its intended containment function.

OSHA concluded that the use of certain engineering and work practice controls is capable of reducing employee exposures to asbestos to levels below the final standard's action level (0.1 f/cm^3). (See 51 FR 22714, June 20, 1986.) Several controls and work practices, used either singly or in combination, can be employed effectively to reduce asbestos exposures during small maintenance and renovation operations. These include:

1. Wet methods.
2. Removal methods.
i. Use of glove bags.
ii. Removal of entire asbestos insulated pipes or structures.
iii. Use of minienclosures.
3. Enclosure of asbestos materials.
4. Maintenance programs.

This appendix describes these controls and work practices in detail.

Preparation of the Area Before Renovation or Maintenance Activities

The first step in preparing to perform a small-scale, short-duration asbestos renovation or maintenance task, regardless of the abatement method that will be used, is the removal from the work area of all objects that are movable to protect them from asbestos contamination. Objects that cannot be removed must be covered completely with 6-mil-thick polyethylene plastic sheeting before the task begins. If objects have already been contaminated, they should be thoroughly cleaned with a High Efficiency Particulate Air (HEPA) filtered vacuum or be wet-wiped before they are removed from the work area or completely encased in the plastic.

Wet methods. Whenever feasible, and regardless of the abatement method to be used (e.g., removal, enclosure, use of glove bags), wet methods must be used during small-scale, short-duration maintenance and renovation activities that involve disturbing asbestos-containing materials. Handling asbestos materials wet is one of the most reliable methods of ensuring that asbestos fibers do not become airborne, and this practice should therefore be used whenever feasible. Wet methods can be used in the great majority of workplace situations. Only in cases where asbestos work must be performed on live electrical equipment, on live steam lines, or in other areas where water will seriously damage materials or equipment may dry removal be performed. Amended water or another wetting agent should be applied by means of an airless sprayer to minimize the extent to which the asbestos-containing material is disturbed.

Asbestos-containing material should be wetted from the initiation of the maintenance or renovation operation and wetting agents should be used continually throughout the work period to ensure that any dry asbestos-containing material exposed in the course of the work is wet and remains wet until final disposal.

Removal of small amount of asbestos-containing materials. Several methods can be used to remove small amounts of asbestos-containing materials during small-scale, short-duration renovation or maintenance tasks. These include the use of glove bags, the removal of an entire asbestos-covered pipe or structure, and the construction of minienclosures. The procedures that employers must use for each of these operations if they wish to avail themselves of the rule's exemptions are described in the following sections.

Glove bags. OSHA found that the use of glove bags to enclose the work area during small-scale, short-duration maintenance or renovation activities will result in employee exposure to asbestos that are below the rule's action level of 0.1 f/cm [8]. This appendix provides requirements for glove-bag procedures to be followed by employers wishing to avail themselves of the rule's exemption for each activity. OSHA has determined that the use of these procedures will reduce the 8-hour time weighted average (TWA) exposure of employees involved in these work operations to levels below the action level and will thus provide a degree of employee protection equivalent to that provided by compliance with all provisions of the rule.

Glove bag installation. Glove bags are approximately 40-inch-wide times 64-inch-long bags fitted with arms through which the work can be performed. When properly installed and used, they permit workers to remain completely isolated from the asbestos material removed or replaced inside the bag. Glove bags can thus provide a flexible, easily installed, and quickly dismantled temporary small work area enclosure that is ideal for small-scale asbestos renovation or maintenance jobs. These bags are single-use control devices that are disposed of at the end of each job. The bags are made of transparent 6-mil-thick polyethylene plastic with areas of Tyvek [1] material (the same material used to make the disposal protective suits used in major asbestos removal, renovation, and demolition operations and in protective gloves). Glove bags are readily available from safety supply stores or specialty asbestos removal supply houses. Glove bags come pre-labelled with the asbestos warning label prescribed by OSHA and EPA for bags used to dispose of asbestos waste.

Glove bag equipment and supplies. Supplies and materials that are necessary to use glove bags effectively include:

1. Tape to seal glove bag to the area from which asbestos is to be removed.
2. Amended water or other wetting agents.
3. An airless sprayer for the application of the wetting agent.
4. Bridging encapsulant (a paste-like substance for coating asbestos) to seal the rough edges of any asbestos-containing materials that remain within the glove bag at the points of attachment after the rest of the asbestos has been removed.
5. Tools such as razor knives, nips, and wire brushes (or other tools suitable for cutting wires, etc.).
6. A HEPA filter-equipped vacuum for evacuating the glove bag (to minimize the release of asbestos fibers) during removal of the bag from the work area and for cleaning any material that may have escaped during the installation of the glove bag.
7. HEPA-equipped dual-cartridge or more protective respirators for use by the employees involved in the removal of asbestos with the glove bag.

Glove bag work practices. The proper use of glove bags requires the following steps:

1. Glove bags must be installed so that they completely cover the pipe or other structure where asbestos work is to be done. Glove bags are installed by cutting the sides of the glove bag to fit the size of the pipe from which asbestos is to be removed. The glove bag is attached to the pipe by folding the open edges together and securely sealing them with tape. All openings in the glove bag must be sealed with duct tape or equivalent material. The bottom seam of the glove bag must also be sealed with duct tape or equivalent to prevent any leakage from the bag that may result from a defect in the bottom seam.
2. The employee who is performing the asbestos removal with the glove bag must don at least a half mask dual-cartridge HEPA-equipped respirator; respirators should be worn by employees who are in close contact with the glove bag and who may thus be exposed as a result of small gaps in the

[1] Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

seams of the bag or holes punched through the bag by a razor knife or a piece of wire mesh.

3. The removed asbestos material from the pipe or other surface that has fallen into the enclosed bag must be thoroughly wetted with a wetting agent (applied with an airless sprayer through the precut port provided in most gloves bags or applied through a small hole in the bag).

4. Once the asbestos material has been thoroughly wetted, it can be removed from the pipe, beam, or other surface. The choice of tool to use to remove the asbestos-containing material depends on the type of material to be removed. Asbestos-containing materials are generally covered with painted canvas and/or wire mesh. Painted canvas can be cut with a razor knife and peeled away from the asbestos-containing material underneath. Once the canvas has been peeled away, the asbestos-containing material underneath may be dry, in which case it should be resprayed with a wetting agent to ensure that it generates as little dust as possible when removed. If the asbestos-containing material is covered with wire mesh, the mesh should be cut with nips, tin snips, or other appropriate tool and removed.

A wetting agent must then be used to spray any layer of dry material that is exposed beneath the mesh, the surface of the stripped underlying structure, and the inside of the glove bag.

5. After removal of the layer of asbestos-containing material, the pipe or surface from which asbestos has been removed must be thoroughly cleaned with a wire brush and wet-wiped with a wetting agent until no traces of the asbestos-containing material can be seen.

6. Any asbestos-containing insulation edges that have been exposed as a result of the removal or maintenance activity must be encapsulated with bridging encapsulant to ensure that the edges do not release asbestos fibers to the atmosphere after the glove bag has been removed.

7. When the asbestos removal and encapsulation have been completed, a vacuum hose from a HEPA filtered vacuum must be inserted into the glove bag through the port to remove any air in the bag that may contain asbestos fibers. When the air has been removed from the bag, the bag should be squeezed tightly (as close to the top as possible), twisted, and sealed with tape, to keep the asbestos materials safely in the bottom of the bag. The HEPA vacuum can then be removed from the bag and the glove bag itself can be removed from the work area to be disposed of properly.

Minienclosures. In some instances, such as removal of asbestos from a small ventilation system or from a short length of duct, a glove bag may not be either large enough or of the proper shape to enclose the work area. In such cases, a minienclosure can be built around the area where small-scale, short-duration asbestos maintenance or renovation work is to be performed. Such enclosures should be constructed of 6-mil-thick polyethylene plastic sheeting and can be small enough to restrict entry to the asbestos work area to one worker.

For example, a minienclosure can be built in a small utility closet when asbestos-containing duct covering is to be removed. The enclosure is constructed by:

1. Affixing plastic sheeting to the walls with spray adhesive and tape.

2. Covering the floor with plastic and sealing the plastic covering the floor to the plastic on the walls.

3. Sealing any penetrations such as pipes or electrical conducts with tape.

4. Constructing a small change room (approximately 3 feet square) made of 6-mil-thick polyethylene plastic supported by 2-inch by 4-inch lumber (the plastic should be attached to the lumber supports with staples or spray adhesive and tape).

The change room should be contiguous to the minienclosure, and is necessary to allow the worker to vacuum off his protective coveralls and remove them before leaving the work area. While inside minienclosure, the worker should wear Tyvek [1] disposable coveralls and use the appropriate HEPA-filtered dual-cartridge or more protective respiratory protection.

The advantages of minienclosures are that they limit the spread of asbestos contamination, reduce the potential exposure of bystanders and other workers who may be working in adjacent areas, and are quick and easy to install. The disadvantage of minienclosures is that they may be too small to contain the equipment necessary to create a negative pressure within the enclosure; however the double layer of plastic sheeting will serve to restrict the release of asbestos fibers to the area outside the enclosure.

Removal of entire structures. When pipes are insulated with asbestos-containing materials, removal of the entire pipe may be more protective, easier, and more cost-effective than stripping the asbestos insulation from the pipe. Before such a pipe is cut, the asbestos-containing insulation must be wrapped with 6-mil polyethylene plastic and securely sealed with duct tape or equivalent. This plastic covering will prevent asbestos fibers from becoming airborne as a result of the vibration created by the power saws used to cut the pipe. If possible, the pipes should be cut at locations that are not insulated to avoid disturbing the asbestos. If a pipe is completely insulated with asbestos-containing materials, small sections should be stripped using the glove-bag method described above before the pipe is cut at the stripped sections.

Enclosure. The decision to enclose rather than remove asbestos-containing material from an area depends on the building owner's preference, i.e., for removal or containment. Owners consider such factors as cost effectiveness, the physical configuration of the work area, and the amount of traffic in the area when determining which abatement method to use.

If the owner chooses to enclose the structure rather than to remove the asbestos-containing material insulating it, a solid structure (airtight walls and ceilings) must be built around the asbestos covered pipe or structure to prevent the release of asbestos-containing materials into the area beyond the enclosure and to prevent disturbing these materials by casual contact during future maintenance operations.

Such a permanent (i.e., for the life of the building) enclosure should be built of new construction materials and should be impact resistant and airtight. Enclosure walls should be made of tongue-and-groove boards, boards with spine joints, or gypsum boards having taped seams. The underlying structure must be able to support the weight of the enclosure. (Suspended ceilings with laid-in panels do not provide airtight enclosures and should not be used to enclose structures covered with asbestos-containing materials.) All joints between the walls and ceiling of the enclosure should be caulked to prevent the escape of asbestos fibers. During the installation of enclosures, tools that are used (such as drills or rivet tools) should be equipped with HEPA-filtered vacuums. Before constructing the enclosure, all electrical conduits, telephone lines, recessed lights, and pipes in the area to be enclosed should be moved to ensure that the enclosure will not have to be re-opened later for routine or emergency maintenance. If such lights or other equipment cannot be moved to a new location for logistic reasons, or if moving them will disturb the asbestos-containing materials, removal rather than enclosure of the asbestos-

containing materials is the appropriate control method to use.

Maintenance program. An asbestos maintenance program must be initiated in all facilities that have friable asbestos-containing materials. Such a program should include:

1. Development of an inventory of all asbestos-containing materials in the facility.
2. Periodic examination of all asbestos-containing materials to detect deterioration.
3. Written procedures for handling asbestos materials during the performance of small-scale, short-duration maintenance and renovation activities.
4. Written procedures for asbestos disposal.
5. Written procedures for dealing with asbestos-related emergencies.

Members of the building's maintenance engineering staff (electricians, heating/air conditioning engineers, plumbers, etc.) who may be required to handle asbestos-containing materials should be trained in safe procedures. Such training should include at a minimum:

1. Information regarding types of ACM and its various uses and forms.
2. Information on the health effects associated with asbestos exposure.
3. Descriptions of the proper methods of handling asbestos-containing materials.
4. Information on the use of HEPA-equipped dual-cartridge respirators and other personal protection during maintenance activities.

Prohibited activities. The training program for the maintenance engineering staff should describe methods of handling asbestos-containing materials as well as routine maintenance activities that are prohibited when asbestos-containing materials are involved. For example, maintenance staff employees should be instructed:

1. *Not* to drill holes in asbestos-containing materials.
2. *Not* to hang plants or pictures on structures covered with asbestos-containing materials.
3. *Not* to sand asbestos-containing floor tile.
4. *Not* to damage asbestos-containing materials while moving furniture or other objects.
5. *Not* to install curtains, drapes, or dividers in such a way that they damage asbestos-containing materials.
6. *Not* to dust floors, ceilings, moldings or other surfaces in asbestos-contaminated environments with a dry brush or sweep with a dry broom.
7. *Not* to use an ordinary vacuum to clean up asbestos-containing debris.
8. *Not* to remove ceiling tiles below asbestos-containing materials without wearing the proper respiratory protection, clearing the area of other people, and observing asbestos removal waste disposal procedures.
9. *Not* to remove ventilation system filters dry.
10. *Not* to shake ventilation system filters.

Appendix D to Subpart E—Transport and Disposal of Asbestos Waste

For the purposes of this appendix, transport is defined as all activities from receipt of the containerized asbestos waste at the generation site until it has been unloaded at the disposal site. Current EPA regulations state that there must be no visible emissions to the outside air during waste transport. However, recognizing the potential hazards and subsequent liabilities associated with exposure, the following additional precautions are recommended.

Recordkeeping. Before accepting wastes, a transporter should determine if the waste is properly wetted and containerized. The transporter should then require a chain-of-custody form signed by the generator. A chain-of-custody form may include the name and address of the generator, the name and address of the pickup site, the estimated quantity of asbestos waste, types of containers used, and the destination of the waste. The chain-of-custody form should then be signed over to a disposal site operator to transfer responsibility for the asbestos waste. A copy of the form signed by the disposal site operator should be maintained by the transporter as evidence of receipt at the disposal site.

Waste handling. A transporter should ensure that the asbestos waste is properly contained in leak-tight containers with appropriate labels, and that the outside surfaces of the containers are not contaminated with asbestos debris adhering to the containers. If there is reason to believe that the condition of the asbestos waste may allow significant fiber release, the transporter should not accept the waste. Improper containerization of wastes is a violation of the NESHAPs regulation and should be reported to the appropriate EPA Regional Asbestos NESHAPs contact below:

Region I

Asbestos NESHAPs Contact, Air Management Division, USEPA, Region I, JFK Federal Building, Boston, MA 02203, (617) 223–3266.

Region II

Asbestos NESHAPs Contact, Air & Waste Management Division, USEPA, Region II, 26 Federal Plaza, New York, NY 10007, (212) 264–6770.

Region III

Asbestos NESHAPs Contact, Air Management Division, USEPA, Region III, 841 Chestnut Street, Philadelphia, PA 19107, (215) 597–9325.

Region IV

Asbestos NESHAPs Contact, Air, Pesticide & Toxic Management, USEPA, Region IV, 345 Courtland Street, NE., Atlanta, GA 30365, (404) 347–4298.

Region V

Asbestos NESHAPs Contact, Air Management Division, USEPA, Region V, 230 S. Dearborn Street, Chicago, IL 60604, (312) 353–6793.

Region VI

Asbestos NESHAPs Contact, Air & Waste Management Division, USEPA, Region VI, 1445 Ross Avenue, Dallas, TX 75202, (214) 655–7229.

Region VII

Asbestos NESHAPs Contact, Air & Waste Management Division, USEPA, Region VII, 726 Minnesota Avenue, Kansas City, KS 66101, (913) 236–2896.

Region VIII

Asbestos NESHAPs Contact, Air & Waste Management Division, USEPA, Region VIII, 999 18th Street, Suite 500, Denver, CO 80202, (303) 293–1814.

Region IX

Asbestos NESHAPs Contact, Air Management Division, USEPA, Region IX, 215 Fremont Street, San Francisco, CA 94105, (415) 974–7633.

Region X

Asbestos NESHAPs Contact, Air & Toxics Management Division, USEPA, Region X, 1200 Sixth Avenue, Seattle, WA 98101, (206) 442–2724.

Once the transporter is satisfied with the condition of the asbestos waste and agrees to handle it, the containers should be loaded into the transport vehicle in a careful manner to prevent breaking of the containers. Similarly, at the disposal site, the asbestos waste containers should be transferred carefully to avoid fiber release.

Waste transport. Although there are no regulatory specifications regarding the transport vehicle, it is recommended that vehicles used for transport of containerized asbestos waste have an enclosed carrying compartment or

COMPARISON OF
AHERA TRAINING REQUIREMENTS

Designated Person	2-Hour General Awareness	16-Hour for Persons Who Disturb Asbestos
° health effects of asbestos ° detection, identification, and assessment of ACM ° options for controlling ACBM ° asbestos management programs ° relevant Federal/State regulations - AHERA - OSHA - Labor - D.O.T. - E.P.A.	° information re asbestos and its forms and uses ° health effects associated with asbestos exposure ° locations of ACBM identified in each building in which they work ° recognition of damage, deterioration, delamination of ACBM ° name and telephone number of designated person, and availability and location of management plan	2-hour general awareness PLUS ° descriptions of proper methods of handling ACBM ° information on use of respiratory protection as in EPA/ OSHA document named in 40 C.F.R. 763.92(a)(2)(ii) ° AHERA rule provisions 763.91 - O&M 763.92 - Training & periodic surveillance Appendix A - Interim TEM Methods Appendix B - Work Practices, SS, SD Appendix C - Model Accreditation Plan Appendix D - Transport and Disposal of Waste 763. Subpart G - (Worker Protection) 40 C.F.R. Part 61 Subpart M-NESHAP OSHA regulations at 29 C.F.R. 1926.58 ° hands-on training in use of respiratory protection, other personal protection measures, and good work practices

THE CLEAN AIR ACT

Congress created and developed a system aimed at reducing and where feasible, elimination hazardous air pollutants. This is accomplished through the National Emissions Standard for Hazardous Air Pollutants (NESHAPs). The US EPA has promulgated regulations specifically addressing asbestos emissions under 40 CFR Part 61, Subpart M of NESHAPs.

HIGHLIGHST OF THE NESHAPs ASBESTOS REGULATIONS (40 CFR 61, SUBPART M)

- Notification requirements are established for each owner or operator of a demolition or renovation operation involving a facility containing regulated asbestos material (61.145(b)).

- No visible emissions to the outside air are permitted during the collection, processing, packaging, transporting, or deposition of any asbestos-containing waste material (61.145(c)).

- All asbestos-containing waste material is to be deposited at waste disposal sites operated in accordance with this regulation (61.150).

March 2019

MEMORANDUM

To: Asbestos/Demolition Contractors
From: Manager, Health Hazards Control Unit
Subject: Asbestos Renovation/Demolition (R/D) Requirements
National Emission Standards for Hazardous Air Pollutants (NESHAP)

Enclosed is information concerning the National Emission Standards for Hazardous Air Pollutants (NESHAP) - - Asbestos regulations (40 CFR, Part 61, Subpart M). Alsoo included is a copy of the regulations and a list of persons to be notified of each R/Do project and a description of their related area of responsibility. Admiration of asbestos R/D activities under the NESHAP is the responsibility of the Health Hazards Control Unito (HHCU).

The NESHAP regulations require the following:

Inspection:

A thorough inspection of the affected area for the presence of asbestos by a NC accredited asbestos inspector is required before beginning any R/D activity.

Notification:

1)o A notification 10 working days prior to beginning renovations involving the removal of more than 160 sq. ft., 260 In. ft., or 35 cu. ft. of regulated asbestos-containing materialo (RACM);

2)o A notification 10 working days prior to beginning demolition activities involving theo removal of more than 160 sq. ft., 260 In. ft., or 35 cu. ft. of RACM; and,o

3)o A notification 10 working days prior to beginning demolition activities even if no asbestoso has been identified in the facility.o

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES • DIVISION OF PUBLIC HEALTH
LOCATION: 5505 Six Forks Road, Building 1, Raleigh, NC 27609
MAILING ADDRESS: 1912 Mail Service Center, Raleigh, NC 27699-1912
www.ncdhhs.gov • TEL: 919-707-5950 • FAX: 919-870-4808
AN EQUAL OPPORTUNITY / AFFIRMATIVE ACTION EMPLOYER

All notifications are to be submitted on an **Asbestos Permit Application and Notification for Demolition/Renovation Form (DHHS 3768).** This form also serves as an asbestos removal permit application as required by the NC Asbestos Hazard Management Program Rules. Asbestos removal permit fees should be submitted along with the application where applicable.

Copies of DHHS 3768, as well as a form which may be used when revisions of the initial notification are required, may be found in the NORTH CAROLINA ASBESTOS RULES, REGULATIONS, AND PROCEDURES packet available from this office. Copies of forms may also be found on our website at: https://epi.dph.ncdhhs.gov/asbestos/ahmp.html

Proper Work Practices/No Visible Emissions:

Maintain asbestos adequately wet at all times during the removal process and allow no visible emissions to the outside air.

Proper Disposal:

An **Asbestos Waste Shipment Record (DHHS 3787)**, required for transporting and disposal of asbestos-containing waste materials is included in this packet for you information.

If you have any questions or need additional information concerning notifications, the NESHAP regulations or the North Carolina requirements for asbestos removal permits or accreditations, please contact our office at 919-707-5950.

Your cooperation in protecting and maintaining clean air in North Carolina is greatly appreciated.

ASBESTOS CONTACTS

Statewide

NC Department of Labor
4 West Edenton Street
Raleigh, NC 27601
Telephone: 1-800-625-2267 or 919-707-7846

For help with:

OSHA Consultations
OSHA Inspections

Health Hazards Control Unit (HHCU)
NC Department of Health & Human Services
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: 919-707-5950
FAX: 919-870-4808

AHERA (Asbestos Hazard Emergency Response Act)

NESHAP (97 counties)

NC Asbestos Hazard Management Program Rules

LOCAL AGENCIES REQUIRING NOTIFICATION

Three NC counties have been delegated authority by the US Environmental Protection Agency to enforce the NESHAP within their jurisdictions. The following agencies must be notified, in addition to the HHCU, of demolitions and asbestos removal projects occurring within their county:

Buncombe County
Western North Carolina Regional Air Pollution Control Agency
30 Valley Street
Asheville, NC 28801
Telephone: 828-250-6777

Forsyth County
Environmental Assistance and Protection Department
201 N Chestnut Street
Winston-Salem, NC 27101
Telephone: 336-703-2440

Mecklenburg County
Land Use and Environmental Services Agency
Mecklenburg Air Quality
2145 Suttle Avenue
Charlotte, NC 28208
Telephone: 704-336-5430

Revised (8/15, 6/16, 3/19, 11/22)

(C) The date of each determination of the maximum concentration point, as described in § 61.139(h), and a brief reason for the determination.

(ii) For each vapor incinerator, the date and duration of each exceedance of the boundary parameters recorded under § 61.139(i)(6) and a brief description of the corrective action taken.

(iii) For each vapor incinerator, the date and duration of each period specified as follows:

(A) Each period recorded under § 61.139(i)(7)(i) when the vent stream is diverted from the control device or has no flow rate;

(B) Each period recorded under § 61.139(i)(7)(ii) when the vent stream is diverted from the control device; and

(C) Each period recorded under § 61.139(i)(7)(iii) when the vent stream is diverted from the control device, when the car seal is broken, when the valve is unlocked, or when the valve position has changed.

(iv) For each vapor incinerator, the owner or operator shall specify the method of monitoring chosen under paragraph (f)(2) of this section in the first semiannual report. Any time the owner or operator changes that choice, he shall specify the change in the first semiannual report following the change.

[56 FR 47407, Sept. 19, 1991, as amended at 64 FR 7467, Feb. 12, 1999; 65 FR 62157, Oct. 17, 2000]

Subpart M—National Emission Standard for Asbestos

AUTHORITY: 42 U.S.C. 7401, 7412, 7414, 7416, 7601.

SOURCE: 49 FR 13661, Apr. 5, 1984, unless otherwise noted.

§ 61.140 Applicability.

The provisions of this subpart are applicable to those sources specified in §§ 61.142 through 61.151, 61.154, and 61.155.

[55 FR 48414, Nov. 20, 1990]

§ 61.141 Definitions.

All terms that are used in this subpart and are not defined below are given the same meaning as in the Act and in subpart A of this part.

Active waste disposal site means any disposal site other than an inactive site.

Adequately wet means sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet.

Asbestos means the asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite, anthophyllite, and actinolite-tremolite.

Asbestos-containing waste materials means mill tailings or any waste that contains commercial asbestos and is generated by a source subject to the provisions of this subpart. This term includes filters from control devices, friable asbestos waste material, and bags or other similar packaging contaminated with commercial asbestos. As applied to demolition and renovation operations, this term also includes regulated asbestos-containing material waste and materials contaminated with asbestos including disposable equipment and clothing.

Asbestos mill means any facility engaged in converting, or in any intermediate step in converting, asbestos ore into commercial asbestos. Outside storage of asbestos material is not considered a part of the asbestos mill.

Asbestos tailings means any solid waste that contains asbestos and is a product of asbestos mining or milling operations.

Asbestos waste from control devices means any waste material that contains asbestos and is collected by a pollution control device.

Category I nonfriable asbestos-containing material (ACM) means asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in appendix E, subpart E, 40 CFR part 763, section 1, Polarized Light Microscopy.

Category II nonfriable ACM means any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos as determined using the methods specified in appendix E, subpart E, 40 CFR part 763, section 1, Polarized Light Microscopy that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Commercial asbestos means any material containing asbestos that is extracted from ore and has value because of its asbestos content.

Cutting means to penetrate with a sharp-edged instrument and includes sawing, but does not include shearing, slicing, or punching.

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

Emergency renovation operation means a renovation operation that was not planned but results from a sudden, unexpected event that, if not immediately attended to, presents a safety or public health hazard, is necessary to protect equipment from damage, or is necessary to avoid imposing an unreasonable financial burden. This term includes operations necessitated by nonroutine failures of equipment.

Fabricating means any processing (*e.g.*, cutting, sawing, drilling) of a manufactured product that contains commercial asbestos, with the exception of processing at temporary sites (field fabricating) for the construction or restoration of facilities. In the case of friction products, fabricating includes bonding, debonding, grinding, sawing, drilling, or other similar operations performed as part of fabricating.

Facility means any institutional, commercial, public, industrial, or residential structure, installation, or building (including any structure, installation, or building containing condominiums or individual dwelling units operated as a residential cooperative, but excluding residential buildings having four or fewer dwelling units); any ship; and any active or inactive waste disposal site. For purposes of this definition, any building, structure, or installation that contains a loft used as a dwelling is not considered a residential structure, installation, or building. Any structure, installation or building that was previously subject to this subpart is not excluded, regardless of its current use or function.

Facility component means any part of a facility including equipment.

Friable asbestos material means any material containing more than 1 percent asbestos as determined using the method specified in appendix E, subpart E, 40 CFR part 763, section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent as determined by a method other than point counting by polarized light microscopy (PLM), verify the asbestos content by point counting using PLM.

Fugitive source means any source of emissions not controlled by an air pollution control device.

Glove bag means a sealed compartment with attached inner gloves used for the handling of asbestos-containing materials. Properly installed and used, glove bags provide a small work area enclosure typically used for small-scale asbestos stripping operations. Information on glove-bag installation, equipment and supplies, and work practices is contained in the Occupational Safety and Health Administration's (OSHA's) final rule on occupational exposure to asbestos (appendix G to 29 CFR 1926.58).

Grinding means to reduce to powder or small fragments and includes mechanical chipping or drilling.

In poor condition means the binding of the material is losing its integrity as indicated by peeling, cracking, or crumbling of the material.

Inactive waste disposal site means any disposal site or portion of it where additional asbestos-containing waste material has not been deposited within the past year.

Installation means any building or structure or any group of buildings or structures at a single demolition or renovation site that are under the control of the same owner or operator (or owner or operator under common control).

Leak-tight means that solids or liquids cannot escape or spill out. It also means dust-tight.

Malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner so that emissions of asbestos are increased. Failures of equipment shall not be considered malfunctions if they are caused in any way by poor maintenance, careless operation, or any other preventable upset conditions, equipment breakdown, or process failure.

Manufacturing means the combining of commercial asbestos—or, in the case of woven friction products, the combining of textiles containing commercial asbestos—with any other material(s), including commercial asbestos, and the processing of this combination into a product. Chlorine production is considered a part of manufacturing.

Natural barrier means a natural object that effectively precludes or deters access. Natural barriers include physical obstacles such as cliffs, lakes or other large bodies of water, deep and wide ravines, and mountains. Remoteness by itself is not a natural barrier.

Nonfriable asbestos-containing material means any material containing more than 1 percent asbestos as determined using the method specified in appendix E, subpart E, 40 CFR part 763, section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Nonscheduled renovation operation means a renovation operation necessitated by the routine failure of equipment, which is expected to occur within a given period based on past operating experience, but for which an exact date cannot be predicted.

Outside air means the air outside buildings and structures, including, but not limited to, the air under a bridge or in an open air ferry dock.

Owner or operator of a demolition or renovation activity means any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.

Particulate asbestos material means finely divided particles of asbestos or material containing asbestos.

Planned renovation operations means a renovation operation, or a number of such operations, in which some RACM will be removed or stripped within a given period of time and that can be predicted. Individual nonscheduled operations are included if a number of such operations can be predicted to occur during a given period of time based on operating experience.

Regulated asbestos-containing material (RACM) means (a) Friable asbestos material, (b) Category I nonfriable ACM that has become friable, (c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by this subpart.

Remove means to take out RACM or facility components that contain or are covered with RACM from any facility.

Renovation means altering a facility or one or more facility components in any way, including the stripping or removal of RACM from a facility component. Operations in which load-supporting structural members are wrecked or taken out are demolitions.

Resilient floor covering means asbestos-containing floor tile, including asphalt and vinyl floor tile, and sheet vinyl floor covering containing more than 1 percent asbestos as determined using polarized light microscopy according to the method specified in appendix E, subpart E, 40 CFR part 763, section 1, Polarized Light Microscopy.

Roadways means surfaces on which vehicles travel. This term includes public and private highways, roads, streets, parking areas, and driveways.

Strip means to take off RACM from any part of a facility or facility components.

Structural member means any load-supporting member of a facility, such as beams and load supporting walls; or any nonload-supporting member, such as ceilings and nonload-supporting walls.

Visible emissions means any emissions, which are visually detectable without the aid of instruments, coming from

RACM or asbestos-containing waste material, or from any asbestos milling, manufacturing, or fabricating operation. This does not include condensed, uncombined water vapor.

Waste generator means any owner or operator of a source covered by this subpart whose act or process produces asbestos-containing waste material.

Waste shipment record means the shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.

Working day means Monday through Friday and includes holidays that fall on any of the days Monday through Friday.

[49 FR 13661, Apr. 5, 1984; 49 FR 25453, June 21, 1984, as amended by 55 FR 48414, Nov. 20, 1990; 56 FR 1669, Jan. 16, 1991; 60 FR 31920, June 19, 1995]

§ 61.142 Standard for asbestos mills.

(a) Each owner or operator of an asbestos mill shall either discharge no visible emissions to the outside air from that asbestos mill, including fugitive sources, or use the methods specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(b) Each owner or operator of an asbestos mill shall meet the following requirements:

(1) Monitor each potential source of asbestos emissions from any part of the mill facility, including air cleaning devices, process equipment, and buildings that house equipment for material processing and handling, at least once each day, during daylight hours, for visible emissions to the outside air during periods of operation. The monitoring shall be by visual observation of at least 15 seconds duration per source of emissions.

(2) Inspect each air cleaning device at least once each week for proper operation and for changes that signal the potential for malfunction, including, to the maximum extent possible without dismantling other than opening the device, the presence of tears, holes, and abrasions in filter bags and for dust deposits on the clean side of bags. For air cleaning devices that cannot be inspected on a weekly basis according to this paragraph, submit to the Administrator, and revise as necessary, a written maintenance plan to include, at a minimum, the following:

(i) Maintenance schedule.

(ii) Recordkeeping plan.

(3) Maintain records of the results of visible emissions monitoring and air cleaning device inspections using a format similar to that shown in Figures 1 and 2 and include the following:

(i) Date and time of each inspection.

(ii) Presence or absence of visible emissions.

(iii) Condition of fabric filters, including presence of any tears, holes, and abrasions.

(iv) Presence of dust deposits on clean side of fabric filters.

(v) Brief description of corrective actions taken, including date and time.

(vi) Daily hours of operation for each air cleaning device.

(4) Furnish upon request, and make available at the affected facility during normal business hours for inspection by the Administrator, all records required under this section.

(5) Retain a copy of all monitoring and inspection records for at least 2 years.

(6) Submit semiannually a copy of visible emission monitoring records to the Administrator if visible emissions occurred during the report period. Semiannual reports shall be postmarked by the 30th day following the end of the six-month period.

Date of inspection (mo/day/yr)	Time of inspection (a.m./p.m.)	Air cleaning device or fugitive source designation or number	Visible emissions observed (yes/no), corrective action taken	Daily operating hours	Inspector's initials

Figure 1. Record of Visible Emission Monitoring

1. Air cleaning device designation or number _____

2. Date of inspection _____ _____ _____ _____

3. Time of inspection _____ _____ _____ _____

4. Is air cleaning device operating properly (yes/no) _____ _____ _____ _____

5. Tears, holes, or abrasions in fabric filter (yes/no) _____ _____ _____ _____

6. Dust on clean side of fabric filters (yes/no) _____ _____ _____ _____

7. Other signs of malfunctions or potential malfunctions (yes/no) _____ _____ _____ _____

8. Describe other malfunctions or signs of potential malfunctions. _____

_____

_____

9. Describe corrective action(s) taken. _____

_____

_____

10. Date and time corrective action taken _____ _____ _____ _____

11. Inspected by

(Print/Type Name)	(Title)	(Signature)	(Date)
(Print/Type Name)	(Title)	(Signature)	(Date)

Figure 2. Air Cleaning Device Inspection Checklist

[55 FR 48416, Nov. 20, 1990, as amended at 64 FR 7467, Feb. 12, 1999]

§ 61.143 Standard for roadways.

No person may construct or maintain a roadway with asbestos tailings or asbestos-containing waste material on that roadway, unless, for asbestos tailings.

(a) It is a temporary roadway on an area of asbestos ore deposits (asbestos mine): or

(b) It is a temporary roadway at an active asbestos mill site and is encapsulated with a resinous or bituminous

binder. The encapsulated road surface must be maintained at a minimum frequency of once per year to prevent dust emissions; or

(c) It is encapsulated in asphalt concrete meeting the specifications contained in section 401 of Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP–85, 1985, or their equivalent.

[55 FR 48419, Nov. 20, 1990; 56 FR 1669, Jan. 16, 1991]

§ 61.144 Standard for manufacturing.

(a) *Applicability*. This section applies to the following manufacturing operations using commercial asbestos.

(1) The manufacture of cloth, cord, wicks, tubing, tape, twine, rope, thread, yarn, roving, lap, or other textile materials.

(2) The manufacture of cement products.

(3) The manufacture of fireproofing and insulating materials.

(4) The manufacture of friction products.

(5) The manufacture of paper, millboard, and felt.

(6) The manufacture of floor tile.

(7) The manufacture of paints, coatings, caulks, adhesives, and sealants.

(8) The manufacture of plastics and rubber materials.

(9) The manufacture of chlorine utilizing asbestos diaphragm technology.

(10) The manufacture of shotgun shell wads.

(11) The manufacture of asphalt concrete.

(b) *Standard*. Each owner or operator of any of the manufacturing operations to which this section applies shall either:

(1) Discharge no visible emissions to the outside air from these operations or from any building or structure in which they are conducted or from any other fugitive sources; or

(2) Use the methods specified by § 61.152 to clean emissions from these operations containing particulate asbestos material before they escape to, or are vented to, the outside air.

(3) Monitor each potential source of asbestos emissions from any part of the manufacturing facility, including air cleaning devices, process equipment, and buildings housing material processing and handling equipment, at least once each day during daylight hours for visible emissions to the outside air during periods of operation. The monitoring shall be by visual observation of at least 15 seconds duration per source of emissions.

(4) Inspect each air cleaning device at least once each week for proper operation and for changes that signal the potential for malfunctions, including, to the maximum extent possible without dismantling other than opening the device, the presence of tears, holes, and abrasions in filter bags and for dust deposits on the clean side of bags. For air cleaning devices that cannot be inspected on a weekly basis according to this paragraph, submit to the Administrator, and revise as necessary, a written maintenance plan to include, at a minimum, the following:

(i) Maintenance schedule.

(ii) Recordkeeping plan.

(5) Maintain records of the results of visible emission monitoring and air cleaning device inspections using a format similar to that shown in Figures 1 and 2 and include the following.

(i) Date and time of each inspection.

(ii) Presence or absence of visible emissions.

(iii) Condition of fabric filters, including presence of any tears, holes and abrasions.

(iv) Presence of dust deposits on clean side of fabric filters.

(v) Brief description of corrective actions taken, including date and time.

(vi) Daily hours of operation for each air cleaning device.

(6) Furnish upon request, and make available at the affected facility during normal business hours for inspection by the Administrator, all records required under this section.

(7) Retain a copy of all monitoring and inspection records for at least 2 years.

(8) Submit semiannually a copy of the visible emission monitoring records to the Administrator if visible emission occurred during the report period. Semiannual reports shall be postmarked by the 30th day following the end of the six-month period.

[49 FR 13661, Apr. 5, 1984, as amended at 55 FR 48419, Nov. 20, 1990; 56 FR 1669, Jan. 16, 1991; 64 FR 7467, Feb. 12, 1999]

§ 61.145 Standard for demolition and renovation.

(a) *Applicability.* To determine which requirements of paragraphs (a), (b), and (c) of this section apply to the owner or operator of a demolition or renovation activity and prior to the commencement of the demolition or renovation, thoroughly inspect the affected facility or part of the facility where the demolition or renovation operation will occur for the presence of asbestos, including Category I and Category II nonfriable ACM. The requirements of paragraphs (b) and (c) of this section apply to each owner or operator of a demolition or renovation activity, including the removal of RACM as follows:

(1) In a facility being demolished, all the requirements of paragraphs (b) and (c) of this section apply, except as provided in paragraph (a)(3) of this section, if the combined amount of RACM is

(i) At least 80 linear meters (260 linear feet) on pipes or at least 15 square meters (160 square feet) on other facility components, or

(ii) At least 1 cubic meter (35 cubic feet) off facility components where the length or area could not be measured previously.

(2) In a facility being demolished, only the notification requirements of paragraphs (b)(1), (2), (3)(i) and (iv), and (4)(i) through (vii) and (4)(ix) and (xvi) of this section apply, if the combined amount of RACM is

(i) Less than 80 linear meters (260 linear feet) on pipes and less than 15 square meters (160 square feet) on other facility components, and

(ii) Less than one cubic meter (35 cubic feet) off facility components where the length or area could not be measured previously or there is no asbestos.

(3) If the facility is being demolished under an order of a State or local government agency, issued because the facility is structurally unsound and in danger of imminent collapse, only the requirements of paragraphs (b)(1), (b)(2), (b)(3)(iii), (b)(4) (except (b)(4)(viii)), (b)(5), and (c)(4) through (c)(9) of this section apply.

(4) In a facility being renovated, including any individual nonscheduled renovation operation, all the requirements of paragraphs (b) and (c) of this section apply if the combined amount of RACM to be stripped, removed, dislodged, cut, drilled, or similarly disturbed is

(i) At least 80 linear meters (260 linear feet) on pipes or at least 15 square meters (160 square feet) on other facility components, or

(ii) At least 1 cubic meter (35 cubic feet) off facility components where the length or area could not be measured previously.

(iii) To determine whether paragraph (a)(4) of this section applies to planned renovation operations involving individual nonscheduled operations, predict the combined additive amount of RACM to be removed or stripped during a calendar year of January 1 through December 31.

(iv) To determine whether paragraph (a)(4) of this section applies to emergency renovation operations, estimate the combined amount of RACM to be removed or stripped as a result of the sudden, unexpected event that necessitated the renovation.

(5) Owners or operators of demolition and renovation operations are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

(b) *Notification requirements.* Each owner or operator of a demolition or renovation activity to which this section applies shall:

(1) Provide the Administrator with written notice of intention to demolish or renovate. Delivery of the notice by U.S. Postal Service, commercial delivery service, or hand delivery is acceptable.

(2) Update notice, as necessary, including when the amount of asbestos affected changes by at least 20 percent.

(3) Postmark or deliver the notice as follows:

(i) At least 10 working days before asbestos stripping or removal work or any other activity begins (such as site preparation that would break up, dislodge or similarly disturb asbestos material), if the operation is described in paragraphs (a) (1) and (4) (except (a)(4)(iii) and (a)(4)(iv)) of this section. If the operation is as described in paragraph (a)(2) of this section, notification

is required 10 working days before demolition begins.

(ii) At least 10 working days before the end of the calendar year preceding the year for which notice is being given for renovations described in paragraph (a)(4)(iii) of this section.

(iii) As early as possible before, but not later than, the following working day if the operation is a demolition ordered according to paragraph (a)(3) of this section or, if the operation is a renovation described in paragraph (a)(4)(iv) of this section.

(iv) For asbestos stripping or removal work in a demolition or renovation operation, described in paragraphs (a) (1) and (4) (except (a)(4)(iii) and (a)(4)(iv)) of this section, and for a demolition described in paragraph (a)(2) of this section, that will begin on a date other than the one contained in the original notice, notice of the new start date must be provided to the Administrator as follows:

(A) When the asbestos stripping or removal operation or demolition operation covered by this paragraph will begin after the date contained in the notice,

(*1*) Notify the Administrator of the new start date by telephone as soon as possible before the original start date, and

(*2*) Provide the Administrator with a written notice of the new start date as soon as possible before, and no later than, the original start date. Delivery of the updated notice by the U.S. Postal Service, commercial delivery service, or hand delivery is acceptable.

(B) When the asbestos stripping or removal operation or demolition operation covered by this paragraph will begin on a date earlier than the original start date,

(*1*) Provide the Administrator with a written notice of the new start date at least 10 working days before asbestos stripping or removal work begins.

(*2*) For demolitions covered by paragraph (a)(2) of this section, provide the Administrator written notice of a new start date at least 10 working days before commencement of demolition. Delivery of updated notice by U.S. Postal Service, commercial delivery service, or hand delivery is acceptable.

(C) In no event shall an operation covered by this paragraph begin on a date other than the date contained in the written notice of the new start date.

(4) Include the following in the notice:

(i) An indication of whether the notice is the original or a revised notification.

(ii) Name, address, and telephone number of both the facility owner and operator and the asbestos removal contractor owner or operator.

(iii) Type of operation: demolition or renovation.

(iv) Description of the facility or affected part of the facility including the size (square meters [square feet] and number of floors), age, and present and prior use of the facility.

(v) Procedure, including analytical methods, employed to detect the presence of RACM and Category I and Category II nonfriable ACM.

(vi) Estimate of the approximate amount of RACM to be removed from the facility in terms of length of pipe in linear meters (linear feet), surface area in square meters (square feet) on other facility components, or volume in cubic meters (cubic feet) if off the facility components. Also, estimate the approximate amount of Category I and Category II nonfriable ACM in the affected part of the facility that will not be removed before demolition.

(vii) Location and street address (including building number or name and floor or room number, if appropriate), city, county, and state, of the facility being demolished or renovated.

(viii) Scheduled starting and completion dates of asbestos removal work (or any other activity, such as site preparation that would break up, dislodge, or similarly disturb asbestos material) in a demolition or renovation; planned renovation operations involving individual nonscheduled operations shall only include the beginning and ending dates of the report period as described in paragraph (a)(4)(iii) of this section.

(ix) Scheduled starting and completion dates of demolition or renovation.

(x) Description of planned demolition or renovation work to be performed

and method(s) to be employed, including demolition or renovation techniques to be used and description of affected facility components.

(xi) Description of work practices and engineering controls to be used to comply with the requirements of this subpart, including asbestos removal and waste-handling emission control procedures.

(xii) Name and location of the waste disposal site where the asbestos-containing waste material will be deposited.

(xiii) A certification that at least one person trained as required by paragraph (c)(8) of this section will supervise the stripping and removal described by this notification. This requirement shall become effective 1 year after promulgation of this regulation.

(xiv) For facilities described in paragraph (a)(3) of this section, the name, title, and authority of the State or local government representative who has ordered the demolition, the date that the order was issued, and the date on which the demolition was ordered to begin. A copy of the order shall be attached to the notification.

(xv) For emergency renovations described in paragraph (a)(4)(iv) of this section, the date and hour that the emergency occurred, a description of the sudden, unexpected event, and an explanation of how the event caused an unsafe condition, or would cause equipment damage or an unreasonable financial burden.

(xvi) Description of procedures to be followed in the event that unexpected RACM is found or Category II nonfriable ACM becomes crumbled, pulverized, or reduced to powder.

(xvii) Name, address, and telephone number of the waste transporter.

(5) The information required in paragraph (b)(4) of this section must be reported using a form similiar to that shown in Figure 3.

(c) *Procedures for asbestos emission control.* Each owner or operator of a demolition or renovation activity to whom this paragraph applies, according to paragraph (a) of this section, shall comply with the following procedures:

(1) Remove all RACM from a facility being demolished or renovated before any activity begins that would break up, dislodge, or similarly disturb the material or preclude access to the material for subsequent removal. RACM need not be removed before demolition if:

(i) It is Category I nonfriable ACM that is not in poor condition and is not friable.

(ii) It is on a facility component that is encased in concrete or other similarly hard material and is adequately wet whenever exposed during demolition; or

(iii) It was not accessible for testing and was, therefore, not discovered until after demolition began and, as a result of the demolition, the material cannot be safely removed. If not removed for safety reasons, the exposed RACM and any asbestos-contaminated debris must be treated as asbestos-containing waste material and adequately wet at all times until disposed of.

(iv) They are Category II nonfriable ACM and the probability is low that the materials will become crumbled, pulverized, or reduced to powder during demolition.

(2) When a facility component that contains, is covered with, or is coated with RACM is being taken out of the facility as a unit or in sections:

(i) Adequately wet all RACM exposed during cutting or disjoining operations; and

(ii) Carefully lower each unit or section to the floor and to ground level, not dropping, throwing, sliding, or otherwise damaging or disturbing the RACM.

(3) When RACM is stripped from a facility component while it remains in place in the facility, adequately wet the RACM during the stripping operation.

(i) In renovation operations, wetting is not required if:

(A) The owner or operator has obtained prior written approval from the Administrator based on a written application that wetting to comply with this paragraph would unavoidably damage equipment or present a safety hazard; and

(B) The owner or operator uses of the following emission control methods:

(*1*) A local exhaust ventilation and collection system designed and operated to capture the particulate asbestos material produced by the stripping and removal of the asbestos materials. The system must exhibit no visible emissions to the outside air or be designed and operated in accordance with the requirements in § 61.152.

(*2*) A glove-bag system designed and operated to contain the particulate asbestos material produced by the stripping of the asbestos materials.

(*3*) Leak-tight wrapping to contain all RACM prior to dismantlement.

(ii) In renovation operations where wetting would result in equipment damage or a safety hazard, and the methods allowed in paragraph (c)(3)(i) of this section cannot be used, another method may be used after obtaining written approval from the Administrator based upon a determination that it is equivalent to wetting in controlling emissions or to the methods allowed in paragraph (c)(3)(i) of this section.

(iii) A copy of the Administrator's written approval shall be kept at the worksite and made available for inspection.

(4) After a facility component covered with, coated with, or containing RACM has been taken out of the facility as a unit or in sections pursuant to paragraph (c)(2) of this section, it shall be stripped or contained in leak-tight wrapping, except as described in paragraph (c)(5) of this section. If stripped, either:

(i) Adequately wet the RACM during stripping; or

(ii) Use a local exhaust ventilation and collection system designed and operated to capture the particulate asbestos material produced by the stripping. The system must exhibit no visible emissions to the outside air or be designed and operated in accordance with the requirements in § 61.152.

(5) For large facility components such as reactor vessels, large tanks, and steam generators, but not beams (which must be handled in accordance with paragraphs (c)(2), (3), and (4) of this section), the RACM is not required to be stripped if the following requirements are met:

(i) The component is removed, transported, stored, disposed of, or reused without disturbing or damaging the RACM.

(ii) The component is encased in a leak-tight wrapping.

(iii) The leak-tight wrapping is labeled according to § 61.149(d)(1)(i), (ii), and (iii) during all loading and unloading operations and during storage.

(6) For all RACM, including material that has been removed or stripped:

(i) Adequately wet the material and ensure that it remains wet until collected and contained or treated in preparation for disposal in accordance with § 61.150; and

(ii) Carefully lower the material to the ground and floor, not dropping, throwing, sliding, or otherwise damaging or disturbing the material.

(iii) Transport the material to the ground via leak-tight chutes or containers if it has been removed or stripped more than 50 feet above ground level and was not removed as units or in sections.

(iv) RACM contained in leak-tight wrapping that has been removed in accordance with paragraphs (c)(4) and (c)(3)(i)(B)(*3*) of this section need not be wetted.

(7) When the temperature at the point of wetting is below 0 °C (32 °F):

(i) The owner or operator need not comply with paragraph (c)(2)(i) and the wetting provisions of paragraph (c)(3) of this section.

(ii) The owner or operator shall remove facility components containing, coated with, or covered with RACM as units or in sections to the maximum extent possible.

(iii) During periods when wetting operations are suspended due to freezing temperatures, the owner or operator must record the temperature in the area containing the facility components at the beginning, middle, and end of each workday and keep daily temperature records available for inspection by the Administrator during normal business hours at the demolition or renovation site. The owner or operator shall retain the temperature records for at least 2 years.

(8) Effective 1 year after promulgation of this regulation, no RACM shall

be stripped, removed, or otherwise handled or disturbed at a facility regulated by this section unless at least one onsite representative, such as a foreman or management-level person or other authorized representative, trained in the provisions of this regulation and the means of complying with them, is present. Every 2 years, the trained onsite individual shall receive refresher training in the provisions of this regulation. The required training shall include as a minimum: applicability; notifications; material identification; control procedures for removals including, at least, wetting, local exhaust ventilation, negative pressure enclosures, glove-bag procedures, and High Efficiency Particulate Air (HEPA) filters; waste disposal work practices; reporting and recordkeeping; and asbestos hazards and worker protection. Evidence that the required training has been completed shall be posted and made available for inspection by the Administrator at the demolition or renovation site.

(9) For facilities described in paragraph (a)(3) of this section, adequately wet the portion of the facility that contains RACM during the wrecking operation.

(10) If a facility is demolished by intentional burning, all RACM including Category I and Category II nonfriable ACM must be removed in accordance with the NESHAP before burning.

NOTIFICATION OF DEMOLITION AND RENOVATION

Operator Project #	Postmark	Date Received	Notification #

I. TYPE OF NOTIFICATION (O=Original R=Revised C=Cancelled):

II. FACILITY INFORMATION (Identify owner, removal contractor, and other operator)

OWNER NAME:		
Address:		
City:	State:	Zip:
Contact:		Tel:
REMOVAL CONTRACTOR:		
Address:		
City:	State:	Zip:
Contact:		Tel:
OTHER OPERATOR:		
Address:		
City:	State:	Zip:
Contact:		Tel:

III. TYPE OF OPERATION (D=Demo O=Ordered Demo R=Renovation E=Emer.Renovation):

IV. IS ASBESTOS PRESENT? (Yes/No)

V. FACILITY DESCRIPTION (Include building name, number and floor or room number)

Bldg Name:		
Address:		
City:	State:	County:
Site Location:		
Building Size:	# of Floors:	Age in Years:
Present Use:	Prior Use:	

VI. PROCEDURE, INCLUDING ANALYTICAL METHOD, IF APPROPRIATE, USED TO DETECT THE PRESENCE OF ASBESTOS MATERIAL:

VII. APPROXIMATE AMOUNT OF ASBESTOS, INCLUDING: 1. Regulated ACM to be removed 2. Category I ACM Not Removed 3. Category II ACM Not Removed	RACM To Be Removed	Nonfriable Asbestos Material Not To Be Removed		Indicate Unit of Measurement Below	
		Cat I	Cat II	UNIT	
Pipes				LnFt:	Ln m:
Surface Area				SqFt:	Sq m:
Vol RACM Off Facility Component				CuFt:	Cu m:

VIII. SCHEDULED DATES ASBESTOS REMOVAL (MM/DD/YY) Start: Complete:

IX. SCHEDULED DATES DEMO/RENOVATION (MM/DD/YY) Start: Complete:

Continued on page two

Figure 3. Notification of Demolition and Renovation

NOTIFICATION OF DEMOLITION AND RENOVATION (continued)

X. DESCRIPTION OF PLANNED DEMOLITION OR RENOVATION WORK, AND METHOD(S) TO BE USED:		
XI. DESCRIPTION OF WORK PRACTICES AND ENGINEERING CONTROLS TO BE USED TO PREVENT EMISSIONS OF ASBESTOS AT THE DEMOLITION AND RENOVATION SITE:		
XII. WASTE TRANSPORTER #1		
Name:		
Address		
City:	State:	Zip:
Contact Person:		Telephone:
WASTE TRANSPORTER #2		
Name:		
Address:		
City:	State:	Zip:
Contact Person:		Telephone:
XIII. WASTE DISPOSAL SITE		
Name:		
Location:		
City:	State:	Zip:
Telephone:		
XIV. IF DEMOLITION ORDERED BY A GOVERNMENT AGENCY, PLEASE IDENTIFY THE AGENCY BELOW:		
Name:	Title:	
Authority:		
Date of Order (MM/DD/YY):	Date Ordered to Begin (MM/DD/YY):	
XV. FOR EMERGENCY RENOVATIONS		
Date and Hour of Emergency (MM/DD/YY):		
Description of the Sudden, Unexpected Event:		
Explanation of how the event caused unsafe conditions or would cause equipment damage or an unreasonable financial burden:		
XVI. DESCRIPTION OF PROCEDURES TO BE FOLLOWED IN THE EVENT THAT UNEXPECTED ASBESTOS IS FOUND OR PREVIOUSLY NONFRIABLE ASBESTOS MATERIAL BECOMES CRUMBLED, PULVERIZED, OR REDUCED TO POWDER.		
XVI. I CERTIFY THAT AN INDIVIDUAL TRAINED IN THE PROVISIONS OF THIS REGULATION (40 CFR PART 61, SUBPART M) WILL BE ON-SITE DURING THE DEMOLITION OR RENOVATION AND EVIDENC THAT THE REQUIRED TRAINING HAS BEEN ACCOMPLISHED BY THIS PERSON WILL BE AVAILABLE FOR INSPECTION DURING NORMAL BUSINESS HOURS. (Required 1 year after promulgation)		
(Signature of Owner/Operator)		(Date)
XVII. I CERTIFY THAT THE ABOVE INFORMATION IS CORRECT.		
(Signature of Owner/Operator)		(Date)

Figure 3. Notification of Demolition and Renovation

[55 FR 48419, Nov. 20, 1990; 56 FR 1669, Jan. 16, 1991]

§ 61.146 Standard for spraying.

The owner or operator of an operation in which asbestos-containing materials are spray applied shall comply with the following requirements:

(a) For spray-on application on buildings, structures, pipes, and conduits, do not use material containing more than 1 percent asbestos as determined using the method specified in appendix E, subpart E, 40 CFR part 763, section 1,

Polarized Light Microscopy, except as provided in paragraph (c) of this section.

(b) For spray-on application of materials that contain more than 1 percent asbestos as determined using the method specified in appendix E, subpart E, 40 CFR part 763, section 1, Polarized Light Microscopy, on equipment and machinery, except as provided in paragraph (c) of this section:

(1) Notify the Administrator at least 20 days before beginning the spraying operation. Include the following information in the notice:

(i) Name and address of owner or operator.

(ii) Location of spraying operation.

(iii) Procedures to be followed to meet the requirements of this paragraph.

(2) Discharge no visible emissions to the outside air from spray-on application of the asbestos-containing material or use the methods specified by §61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(c) The requirements of paragraphs (a) and (b) of this section do not apply to the spray-on application of materials where the asbestos fibers in the materials are encapsulated with a bituminous or resinous binder during spraying and the materials are not friable after drying.

(d) Owners or operators of sources subject to this paragraph are exempt from the requirements of §§61.05(a), 61.07 and 61.09.

[49 FR 13661, Apr. 5, 1984. Redesignated and amended at 55 FR 48424, Nov. 20, 1990; 60 FR 31920, June 19, 1995]

§61.147 Standard for fabricating.

(a) *Applicability*. This section applies to the following fabricating operations using commercial asbestos:

(1) The fabrication of cement building products.

(2) The fabrication of friction products, except those operations that primarily install asbestos friction materials on motor vehicles.

(3) The fabrication of cement or silicate board for ventilation hoods; ovens; electrical panels; laboratory furniture, bulkheads, partitions, and ceilings for marine construction; and flow control devices for the molten metal industry.

(b) *Standard*. Each owner or operator of any of the fabricating operations to which this section applies shall either:

(1) Discharge no visible emissions to the outside air from any of the operations or from any building or structure in which they are conducted or from any other fugitive sources; or

(2) Use the methods specified by §61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(3) Monitor each potential source of asbestos emissions from any part of the fabricating facility, including air cleaning devices, process equipment, and buildings that house equipment for material processing and handling, at least once each day, during daylight hours, for visible emissions to the outside air during periods of operation. The monitoring shall be by visual observation of at least 15 seconds duration per source of emissions.

(4) Inspect each air cleaning device at least once each week for proper operation and for changes that signal the potential for malfunctions, including, to the maximum extent possible without dismantling other than opening the device, the presence of tears, holes, and abrasions in filter bags and for dust deposits on the clean side of bags. For air cleaning devices that cannot be inspected on a weekly basis according to this paragraph, submit to the Administrator, and revise as necessary, a written maintenance plan to include, at a minimum, the following:

(i) Maintenance schedule.

(ii) Recordkeeping plan.

(5) Maintain records of the results of visible emission monitoring and air cleaning device inspections using a format similar to that shown in Figures 1 and 2 and include the following:

(i) Date and time of each inspection.

(ii) Presence or absence of visible emissions.

(iii) Condition of fabric filters, including presence of any tears, holes, and abrasions.

(iv) Presence of dust deposits on clean side of fabric filters.

(v) Brief description of corrective actions taken, including date and time.

(vi) Daily hours of operation for each air cleaning device.

(6) Furnish upon request and make available at the affected facility during normal business hours for inspection by the Administrator, all records required under this section.

(7) Retain a copy of all monitoring and inspection records for at least 2 years.

(8) Submit semiannually a copy of the visible emission monitoring records to the Administrator if visible emission occurred during the report period. Semiannual reports shall be postmarked by the 30th day following the end of the six-month period.

[49 FR 13661, Apr. 5, 1984. Redesignated and amended at 55 FR 48424, Nov. 20, 1991; 64 FR 7467, Feb. 12, 1999]

§ 61.148 Standard for insulating materials.

No owner or operator of a facility may install or reinstall on a facility component any insulating materials that contain commercial asbestos if the materials are either molded and friable or wet-applied and friable after drying. The provisions of this section do not apply to spray-applied insulating materials regulated under § 61.146.

[55 FR 48424, Nov. 20, 1990]

§ 61.149 Standard for waste disposal for asbestos mills.

Each owner or operator of any source covered under the provisions of § 61.142 shall:

(a) Deposit all asbestos-containing waste material at a waste disposal site operated in accordance with the provisions of § 61.154; and

(b) Discharge no visible emissions to the outside air from the transfer of control device asbestos waste to the tailings conveyor, or use the methods specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air. Dispose of the asbestos waste from control devices in accordance with § 61.150(a) or paragraph (c) of this section; and

(c) Discharge no visible emissions to the outside air during the collection, processing, packaging, or on-site transporting of any asbestos-containing waste material, or use one of the disposal methods specified in paragraphs (c) (1) or (2) of this section, as follows:

(1) Use a wetting agent as follows:

(i) Adequately mix all asbestos-containing waste material with a wetting agent recommended by the manufacturer of the agent to effectively wet dust and tailings, before depositing the material at a waste disposal site. Use the agent as recommended for the particular dust by the manufacturer of the agent.

(ii) Discharge no visible emissions to the outside air from the wetting operation or use the methods specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(iii) Wetting may be suspended when the ambient temperature at the waste disposal site is less than −9.5 °C (15 °F), as determined by an appropriate measurement method with an accuracy of ±1 °C (±2 °F). During periods when wetting operations are suspended, the temperature must be recorded at least at hourly intervals, and records must be retained for at least 2 years in a form suitable for inspection.

(2) Use an alternative emission control and waste treatment method that has received prior written approval by the Administrator. To obtain approval for an alternative method, a written application must be submitted to the Administrator demonstrating that the following criteria are met:

(i) The alternative method will control asbestos emissions equivalent to currently required methods.

(ii) The suitability of the alternative method for the intended application.

(iii) The alternative method will not violate other regulations.

(iv) The alternative method will not result in increased water pollution, land pollution, or occupational hazards.

(d) When waste is transported by vehicle to a disposal site:

(1) Mark vehicles used to transport asbestos-containing waste material during the loading and unloading of the waste so that the signs are visible. The markings must:

(i) Be displayed in such a manner and location that a person can easily read the legend.

(ii) Conform to the requirements for 51 cm × 36 cm (20 in × 14 in) upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph; and

(iii) Display the following legend in the lower panel with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

Legend
DANGER
ASBESTOS DUST HAZARD
CANCER AND LUNG DISEASE HAZARD
Authorized Personnel Only
Notation
2.5 cm (1 inch) Sans Serif, Gothic or Block
2.5 cm (1 inch) Sans Serif, Gothic or Block
1.9 cm (¾ inch) Sans Serif, Gothic or Block
14 Point Gothic

Spacing between any two lines must be a least equal to the height of the upper of the two lines.

(2) For off-site disposal, provide a copy of the waste shipment record, described in paragraph (e)(1) of this section, to the disposal site owner or operator at the same time as the asbestos-containing waste material is delivered to the disposal site.

(e) For all asbestos-containing waste material transported off the facility site:

(1) Maintain asbestos waste shipment records, using a form similar to that shown in Figure 4, and include the following information:

(i) The name, address, and telephone number of the waste generator.

(ii) The name and address of the local, State, or EPA Regional agency responsible for administering the asbestos NESHAP program.

(iii) The quantity of the asbestos-containing waste material in cubic meters (cubic yards).

(iv) The name and telephone number of the disposal site operator.

(v) The name and physical site location of the disposal site.

(vi) The date transported.

(vii) The name, address, and telephone number of the transporter(s).

(viii) A certification that the contents of this consignment are fully and accurately described by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.

(2) For waste shipments where a copy of the waste shipment record, signed by the owner or operator of the designated disposal site, is not received by the waste generator within 35 days of the date the waste was accepted by the initial transporter, contact the transporter and/or the owner or operator of the designated disposal site to determine the status of the waste shipment.

(3) Report in writing to the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the waste generator if a copy of the waste shipment record, signed by the owner or operator of the designated waste disposal site, is not received by the waste generator within 45 days of the date the waste was accepted by the initial transporter. Include in the report the following information:

(i) A copy of the waste shipment record for which a confirmation of delivery was not received, and

(ii) A cover letter signed by the waste generator explaining the efforts taken to locate the asbestos waste shipment and the results of those efforts.

(4) Retain a copy of all waste shipment records, including a copy of the waste shipment record signed by the owner or operator of the designated waste disposal site, for at least 2 years.

(f) Furnish upon request, and make available for inspection by the Administrator, all records required under this section.

Generator	1. Work site name and mailing address	Owner's name	Owner's telephone no.
	2. Operator's name and address		Operator's telephone no.
	3. Waste disposal site (WDS) name, mailing address, and physical site location		WDS phone no.
	4. Name, and address of responsible agency		
	5. Description of materials	6. Containers No. Type	7. Total quantity m^3 (yd^3)
	8. Special handling instructions and additional information		
	9. OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.		
	Printed/typed name & title	Signature	Month Day Year
Transporter	10. Transporter 1 (Acknowledgment of receipt of materials)		
	Printed/typed name & title Address and telephone no.	Signature	Month Day Year
	11. Transporter 2 (Acknowledgment of receipt of materials)		
	Printed/typed name & title Address and telephone no.	Signature	Month Day Year
Disposal Site	12. Discrepancy indication space		
	13. Waste disposal site owner or operator: Certification of receipt of asbestos materials covered by this manifest except as noted in item 12.		
	Printed/typed name & title	Signature	Month Day Year

(Continued)

Figure 4. Waste Shipment Record

INSTRUCTIONS

Waste Generator Section (Items 1-9)

1. Enter the name of the facility at which asbestos waste is generated and the address where the facility is located. In the appropriate spaces, also enter the name of the owner of the facility and the owner's phone number.

2. If a demolition or renovation, enter the name and address of the company and authorized agent responsible for performing the asbestos removal. In the appropriate spaces, also enter the phone number of the operator.

3. Enter the name, address, and physical site location of the waste disposal site (WDS) that will be receiving the asbestos materials. In the appropriate spaces, also enter the phone number of the WDS. Enter "on-site" if the waste will be disposed of on the generator's property.

4. Provide the name and address of the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program.

5. Indicate the types of asbestos waste materials generated. If from a demolition or renovation, indicate the amount of asbestos that is

   - Friable asbestos material
   - Nonfriable asbestos material

6. Enter the number of containers used to transport the asbestos materials listed in item 5. Also enter one of the following container codes used in transporting each type of asbestos material (specify any other type of container used if not listed below):

   DM - Metal drums, barrels
   DP - Plastic drums, barrels
   BA - 6 mil plastic bags or wrapping

7. Enter the quantities of each type of asbestos material removed in units of cubic meters (cubic yards).

8. Use this space to indicate special transportation, treatment, storage or disposal or Bill of Lading information. If an alternate waste disposal site is designated, note it here. Emergency response telephone numbers or similar information may be included here.

9. The authorized agent of the waste generator must read and then sign and date this certification. The date is the date of receipt by transporter.

NOTE: The waste generator must retain a copy of this form.

(continued)

Figure 4. Waste Shipment Record

Transporter Section (Items 10 & 11)

10. & 11. Enter name, address, and telephone number of each transporter used, if applicable. Print or type the full name and title of person accepting responsibility and acknowledging receipt of materials as listed on this waste shipment record for transport. Enter date of receipt and signature.

NOTE: The transporter must retain a copy of this form.

Disposal Site Section (Items 12 & 13)

12. The authorized representative of the WDS must note in this space any discrepancy between waste described on this manifest and waste actually received as well as any improperly enclosed or contained waste. Any rejected materials should be listed and destination of those materials provided. A site that converts asbestos-containing waste material to nonasbestos material is considered a WDS.

13. The signature (by hand) of the authorized WDS agent indicates acceptance and agreement with statements on this manifest except as noted in item 12. The date is the date of signature and receipt of shipment.

NOTE: The WDS must retain a completed copy of this form. The WDS must also send a completed copy to the operator listed in item 2.

Figure 4. Waste Shipment Record

§61.150 Standard for waste disposal for manufacturing, fabricating, demolition, renovation, and spraying operations.

Each owner or operator of any source covered under the provisions of §§61.144, 61.145, 61.146, and 61.147 shall comply with the following provisions:

(a) Discharge no visible emissions to the outside air during the collection, processing (including incineration), packaging, or transporting of any asbestos-containing waste material generated by the source, or use one of the emission control and waste treatment methods specified in paragraphs (a) (1) through (4) of this section.

(1) Adequately wet asbestos-containing waste material as follows:

(i) Mix control device asbestos waste to form a slurry; adequately wet other asbestos-containing waste material; and

(ii) Discharge no visible emissions to the outside air from collection, mixing, wetting, and handling operations, or use the methods specified by §61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air; and

(iii) After wetting, seal all asbestos-containing waste material in leak-tight containers while wet; or, for materials that will not fit into containers without additional breaking, put materials into leak-tight wrapping; and

(iv) Label the containers or wrapped materials specified in paragraph (a)(1)(iii) of this section using warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.1001(j)(4) or 1926.1101(k)(8). The labels shall be printed in letters of sufficient size and contrast so as to be readily visible and legible.

(v) For asbestos-containing waste material to be transported off the facility site, label containers or wrapped materials with the name of the waste generator and the location at which the waste was generated.

(2) Process asbestos-containing waste material into nonfriable forms as follows:

(i) Form all asbestos-containing waste material into nonfriable pellets or other shapes;

(ii) Discharge no visible emissions to the outside air from collection and processing operations, including incineration, or use the method specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(3) For facilities demolished where the RACM is not removed prior to demolition according to §§ 61.145(c)(1) (i), (ii), (iii), and (iv) or for facilities demolished according to § 61.145(c)(9), adequately wet asbestos-containing waste material at all times after demolition and keep wet during handling and loading for transport to a disposal site. Asbestos-containing waste materials covered by this paragraph do not have to be sealed in leak-tight containers or wrapping but may be transported and disposed of in bulk.

(4) Use an alternative emission control and waste treatment method that has received prior approval by the Administrator according to the procedure described in § 61.149(c)(2).

(5) As applied to demolition and renovation, the requirements of paragraph (a) of this section do not apply to Category I nonfriable ACM waste and Category II nonfriable ACM waste that did not become crumbled, pulverized, or reduced to powder.

(b) All asbestos-containing waste material shall be deposited as soon as is practical by the waste generator at:

(1) A waste disposal site operated in accordance with the provisions of § 61.154, or

(2) An EPA-approved site that converts RACM and asbestos-containing waste material into nonasbestos (asbestos-free) material according to the provisions of § 61.155.

(3) The requirements of paragraph (b) of this section do not apply to Category I nonfriable ACM that is not RACM.

(c) Mark vehicles used to transport asbestos-containing waste material during the loading and unloading of waste so that the signs are visible. The markings must conform to the requirements of §§ 61.149(d)(1) (i), (ii), and (iii).

(d) For all asbestos-containing waste material transported off the facility site:

(1) Maintain waste shipment records, using a form similar to that shown in Figure 4, and include the following information:

(i) The name, address, and telephone number of the waste generator.

(ii) The name and address of the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program.

(iii) The approximate quantity in cubic meters (cubic yards).

(iv) The name and telephone number of the disposal site operator.

(v) The name and physical site location of the disposal site.

(vi) The date transported.

(vii) The name, address, and telephone number of the transporter(s).

(viii) A certification that the contents of this consignment are fully and accurately described by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.

(2) Provide a copy of the waste shipment record, described in paragraph (d)(1) of this section, to the disposal site owners or operators at the same time as the asbestos-containing waste material is delivered to the disposal site.

(3) For waste shipments where a copy of the waste shipment record, signed by the owner or operator of the designated disposal site, is not received by the waste generator within 35 days of the date the waste was accepted by the initial transporter, contact the transporter and/or the owner or operator of the designated disposal site to determine the status of the waste shipment.

(4) Report in writing to the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the waste generator if a copy of the waste shipment record, signed by the owner or operator of the designated waste disposal site, is not received by the waste generator within 45 days of the date the waste

was accepted by the initial transporter. Include in the report the following information:

(i) A copy of the waste shipment record for which a confirmation of delivery was not received, and

(ii) A cover letter signed by the waste generator explaining the efforts taken to locate the asbestos waste shipment and the results of those efforts.

(5) Retain a copy of all waste shipment records, including a copy of the waste shipment record signed by the owner or operator of the designated waste disposal site, for at least 2 years.

(e) Furnish upon request, and make available for inspection by the Administrator, all records required under this section.

[55 FR 48429, Nov. 20, 1990; 56 FR 1669, Jan. 16, 1991, as amended at 68 FR 54793, Sept. 18, 2003]

§ 61.151 Standard for inactive waste disposal sites for asbestos mills and manufacturing and fabricating operations.

Each owner or operator of any inactive waste disposal site that was operated by sources covered under § 61.142, 61.144, or 61.147 and received deposits of asbestos-containing waste material generated by the sources, shall:

(a) Comply with one of the following:

(1) Either discharge no visible emissions to the outside air from an inactive waste disposal site subject to this paragraph; or

(2) Cover the asbestos-containing waste material with at least 15 centimeters (6 inches) of compacted nonasbestos-containing material, and grow and maintain a cover of vegetation on the area adequate to prevent exposure of the asbestos-containing waste material. In desert areas where vegetation would be difficult to maintain, at least 8 additional centimeters (3 inches) of well-graded, nonasbestos crushed rock may be placed on top of the final cover instead of vegetation and maintained to prevent emissions; or

(3) Cover the asbestos-containing waste material with at least 60 centimeters (2 feet) of compacted nonasbestos-containing material, and maintain it to prevent exposure of the asbestos-containing waste; or

(4) For inactive waste disposal sites for asbestos tailings, a resinous or petroleum-based dust suppression agent that effectively binds dust to control surface air emissions may be used instead of the methods in paragraphs (a)(1), (2), and (3) of this section. Use the agent in the manner and frequency recommended for the particular asbestos tailings by the manufacturer of the dust suppression agent to achieve and maintain dust control. Obtain prior written approval of the Administrator to use other equally effective dust suppression agents. For purposes of this paragraph, any used, spent, or other waste oil is not considered a dust suppression agent.

(b) Unless a natural barrier adequately deters access by the general public, install and maintain warning signs and fencing as follows, or comply with paragraph (a)(2) or (a)(3) of this section.

(1) Display warning signs at all entrances and at intervals of 100 m (328 ft) or less along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited. The warning signs must:

(i) Be posted in such a manner and location that a person can easily read the legend; and

(ii) Conform to the requirements for 51 cm×36 cm (20″×14″) upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph; and

(iii) Display the following legend in the lower panel with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

Legend	Notation
Asbestos Waste Disposal Site.	2.5 cm (1 inch) Sans Serif, Gothic or Block
Do Not Create Dust	1.9 cm (¾ inch) Sans Serif, Gothic or Block
Breathing Asbestos is Hazardous to Your Health.	14 Point Gothic.

Spacing between any two lines must be at least equal to the height of the upper of the two lines.

(2) Fence the perimeter of the site in a manner adequate to deter access by the general public.

(3) When requesting a determination on whether a natural barrier adequately deters public access, supply information enabling the Administrator to determine whether a fence or a natural barrier adequately deters access by the general public.

(c) The owner or operator may use an alternative control method that has received prior approval of the Administrator rather than comply with the requirements of paragraph (a) or (b) of this section.

(d) Notify the Administrator in writing at least 45 days prior to excavating or otherwise disturbing any asbestos-containing waste material that has been deposited at a waste disposal site under this section, and follow the procedures specified in the notification. If the excavation will begin on a date other than the one contained in the original notice, notice of the new start date must be provided to the Administrator at least 10 working days before excavation begins and in no event shall excavation begin earlier than the date specified in the original notification. Include the following information in the notice:

(1) Scheduled starting and completion dates.

(2) Reason for disturbing the waste.

(3) Procedures to be used to control emissions during the excavation, storage, transport, and ultimate disposal of the excavated asbestos-containing waste material. If deemed necessary, the Administrator may require changes in the emission control procedures to be used.

(4) Location of any temporary storage site and the final disposal site.

(e) Within 60 days of a site becoming inactive and after the effective date of this subpart, record, in accordance with State law, a notation on the deed to the facility property and on any other instrument that would normally be examined during a title search; this notation will in perpetuity notify any potential purchaser of the property that:

(1) The land has been used for the disposal of asbestos-containing waste material;

(2) The survey plot and record of the location and quantity of asbestos-containing waste disposed of within the disposal site required in §61.154(f) have been filed with the Administrator; and

(3) The site is subject to 40 CFR part 61, subpart M.

[49 FR 13661, Apr. 5, 1984, as amended at 53 FR 36972, Sept. 23, 1988. Redesignated and amended at 55 FR 48429, Nov. 20, 1990]

§61.152 Air-cleaning.

(a) The owner or operator who uses air cleaning, as specified in §§61.142(a), 61.144(b)(2), 61.145(c)(3)(i)(B)(*1*), 61.145(c)(4)(ii), 61.145(c)(11)(i), 61.146(b)(2), 61.147(b)(2), 61.149(b), 61.149(c)(1)(ii), 61.150(a)(1)(ii), 61.150(a)(2)(ii), and 61.155(e) shall:

(1) Use fabric filter collection devices, except as noted in paragraph (b) of this section, doing all of the following:

(i) Ensuring that the airflow permeability, as determined by ASTM Method D737–75, does not exceed 9 $m^3/min/m^2$ (30 $ft^3/min/ft^2$) for woven fabrics or 11 $m^3/min/m^2$(35 $ft^3/min/ft^2$) for felted fabrics, except that 12 $m^3/min/m^2$ (40 $ft^3 min/ft^2$) for woven and 14 $m^3/min/m^2$ (45 ft ^{3}min/ft^2) for felted fabrics is allowed for filtering air from asbestos ore dryers; and

(ii) Ensuring that felted fabric weighs at least 475 grams per square meter (14 ounces per square yard) and is at least 1.6 millimeters (one-sixteenth inch) thick throughout; and

(iii) Avoiding the use of synthetic fabrics that contain fill yarn other than that which is spun.

(2) Properly install, use, operate, and maintain all air-cleaning equipment authorized by this section. Bypass devices may be used only during upset or emergency conditions and then only for so long as it takes to shut down the operation generating the particulate asbestos material.

(3) For fabric filter collection devices installed after January 10, 1989, provide for easy inspection for faulty bags.

(b) There are the following exceptions to paragraph (a)(1):

(1) After January 10, 1989, if the use of fabric creates a fire or explosion hazard, or the Administrator determines that a fabric filter is not feasible, the Administrator may authorize as a substitute the use of wet collectors designed to operate with a unit contacting energy of at least 9.95

kilopascals (40 inches water gage pressure).

(2) Use a HEPA filter that is certified to be at least 99.97 percent efficient for 0.3 micron particles.

(3) The Administrator may authorize the use of filtering equipment other than described in paragraphs (a)(1) and (b)(1) and (2) of this section if the owner or operator demonstrates to the Administrator's satisfaction that it is equivalent to the described equipment in filtering particulate asbestos material.

[49 FR 13661, Apr. 5, 1984; 49 FR 25453, June 21, 1984, as amended at 51 FR 8199, Mar. 10, 1986. Redesignated and amended at 55 FR 48430, Nov. 20, 1990]

§ 61.153 Reporting.

(a) Any new source to which this subpart applies (with the exception of sources subject to §§ 61.143, 61.145, 61.146, and 61.148), which has an initial startup date preceding the effective date of this revision, shall provide the following information to the Administrator postmarked or delivered within 90 days of the effective date. In the case of a new source that does not have an initial startup date preceding the effective date, the information shall be provided, postmarked or delivered, within 90 days of the initial startup date. Any owner or operator of an existing source shall provide the following information to the Administrator within 90 days of the effective date of this subpart unless the owner or operator of the existing source has previously provided this information to the Administrator. Any changes in the information provided by any existing source shall be provided to the Administrator, postmarked or delivered, within 30 days after the change.

(1) A description of the emission control equipment used for each process; and

(i) If the fabric device uses a woven fabric, the airflow permeability in $m^3/min/m^2$ and; if the fabric is synthetic, whether the fill yarn is spun or not spun; and

(ii) If the fabric filter device uses a felted fabric, the density in g/m^2, the minimum thickness in inches, and the airflow permeability in $m^3/min/m^2$.

(2) If a fabric filter device is used to control emissions,

(i) The airflow permeability in $m^3/min/m^2$ ($ft^3/min/ft^2$) if the fabric filter device uses a woven fabric, and, if the fabric is synthetic, whether the fill yarn is spun or not spun; and

(ii) If the fabric filter device uses a felted fabric, the density in g/m^2 (oz/yd^2), the minimum thickness in millimeters (inches), and the airflow permeability in $m^3/min/m^2$ ($ft^3/min/ft^2$).

(3) If a HEPA filter is used to control emissions, the certified efficiency.

(4) For sources subject to §§ 61.149 and 61.150:

(i) A brief description of each process that generates asbestos-containing waste material; and

(ii) The average volume of asbestos-containing waste material disposed of, measured in m^3/day (yd^3/day); and

(iii) The emission control methods used in all stages of waste disposal; and

(iv) The type of disposal site or incineration site used for ultimate disposal, the name of the site operator, and the name and location of the disposal site.

(5) For sources subject to §§ 61.151 and 61.154:

(i) A brief description of the site; and

(ii) The method or methods used to comply with the standard, or alternative procedures to be used.

(b) The information required by paragraph (a) of this section must accompany the information required by § 61.10. Active waste disposal sites subject to § 61.154 shall also comply with this provision. Roadways, demolition and renovation, spraying, and insulating materials are exempted from the requirements of § 61.10(a). The information described in this section must be reported using the format of appendix A of this part as a guide.

(Sec. 114. Clean Air Act as amended (42 U.S.C. 7414))

[49 FR 13661, Apr. 5, 1984. Redesignated and amended at 55 FR 48430, Nov. 20, 1990; 56 FR 1669, Jan. 16, 1991]

§ 61.154 Standard for active waste disposal sites.

Each owner or operator of an active waste disposal site that receives asbestos-containing waste material from a source covered under § 61.149, 61.150, or

61.155 shall meet the requirements of this section:

(a) Either there must be no visible emissions to the outside air from any active waste disposal site where asbestos-containing waste material has been deposited, or the requirements of paragraph (c) or (d) of this section must be met.

(b) Unless a natural barrier adequately deters access by the general public, either warning signs and fencing must be installed and maintained as follows, or the requirements of paragraph (c)(1) of this section must be met.

(1) Warning signs must be displayed at all entrances and at intervals of 100 m (330 ft) or less along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited. The warning signs must:

(i) Be posted in such a manner and location that a person can easily read the legend; and

(ii) Conform to the requirements of 51 cm × 36 cm (20″×14″) upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph; and

(iii) Display the following legend in the lower panel with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

Legend	Notation
Asbestos Waste Disposal Site.	2.5 cm (1 inch) Sans Serif, Gothic or Block.
Do Not Create Dust	1.9 cm (¾ inch) Sans Serif, Gothic or Block.
Breathing Asbestos is Hazardous to Your Health.	14 Point Gothic.

Spacing between any two lines must be at least equal to the height of the upper of the two lines.

(2) The perimeter of the disposal site must be fenced in a manner adequate to deter access by the general public.

(3) Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access by the general public.

(c) Rather than meet the no visible emission requirement of paragraph (a) of this section, at the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material that has been deposited at the site during the operating day or previous 24-hour period shall:

(1) Be covered with at least 15 centimeters (6 inches) of compacted nonasbestos-containing material, or

(2) Be covered with a resinous or petroleum-based dust suppression agent that effectively binds dust and controls wind erosion. Such an agent shall be used in the manner and frequency recommended for the particular dust by the dust suppression agent manufacturer to achieve and maintain dust control. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, any used, spent, or other waste oil is not considered a dust suppression agent.

(d) Rather than meet the no visible emission requirement of paragraph (a) of this section, use an alternative emissions control method that has received prior written approval by the Administrator according to the procedures described in § 61.149(c)(2).

(e) For all asbestos-containing waste material received, the owner or operator of the active waste disposal site shall:

(1) Maintain waste shipment records, using a form similar to that shown in Figure 4, and include the following information:

(i) The name, address, and telephone number of the waste generator.

(ii) The name, address, and telephone number of the transporter(s).

(iii) The quantity of the asbestos-containing waste material in cubic meters (cubic yards).

(iv) The presence of improperly enclosed or uncovered waste, or any asbestos-containing waste material not sealed in leak-tight containers. Report in writing to the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the waste generator (identified in the waste shipment record), and, if different, the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the disposal site, by the following working day, the presence of a significant amount of improperly enclosed or uncovered waste. Submit a copy of the

waste shipment record along with the report.

(v) The date of the receipt.

(2) As soon as possible and no longer than 30 days after receipt of the waste, send a copy of the signed waste shipment record to the waste generator.

(3) Upon discovering a discrepancy between the quantity of waste designated on the waste shipment records and the quantity actually received, attempt to reconcile the discrepancy with the waste generator. If the discrepancy is not resolved within 15 days after receiving the waste, immediately report in writing to the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the waste generator (identified in the waste shipment record), and, if different, the local, State, or EPA Regional office responsible for administering the asbestos NESHAP program for the disposal site. Describe the discrepancy and attempts to reconcile it, and submit a copy of the waste shipment record along with the report.

(4) Retain a copy of all records and reports required by this paragraph for at least 2 years.

(f) Maintain, until closure, records of the location, depth and area, and quantity in cubic meters (cubic yards) of asbestos-containing waste material within the disposal site on a map or diagram of the disposal area.

(g) Upon closure, comply with all the provisions of § 61.151.

(h) Submit to the Administrator, upon closure of the facility, a copy of records of asbestos waste disposal locations and quantities.

(i) Furnish upon request, and make available during normal business hours for inspection by the Administrator, all records required under this section.

(j) Notify the Administrator in writing at least 45 days prior to excavating or otherwise disturbing any asbestos-containing waste material that has been deposited at a waste disposal site and is covered. If the excavation will begin on a date other than the one contained in the original notice, notice of the new start date must be provided to the Administrator at least 10 working days before excavation begins and in no event shall excavation begin earlier than the date specified in the original notification. Include the following information in the notice:

(1) Scheduled starting and completion dates.

(2) Reason for disturbing the waste.

(3) Procedures to be used to control emissions during the excavation, storage, transport, and ultimate disposal of the excavated asbestos-containing waste material. If deemed necessary, the Administrator may require changes in the emission control procedures to be used.

(4) Location of any temporary storage site and the final disposal site.

(Secs. 112 and 301(a) of the Clean Air Act as amended (42 U.S.C. 7412, 7601(a))

[49 FR 13661, Apr. 5, 1990. Redesignated and amended at 55 FR 48431, Nov. 20, 1990; 56 FR 1669, Jan. 16, 1991]

§ 61.155 Standard for operations that convert asbestos-containing waste material into nonasbestos (asbestos-free) material.

Each owner or operator of an operation that converts RACM and asbestos-containing waste material into nonasbestos (asbestos-free) material shall:

(a) Obtain the prior written approval of the Administrator to construct the facility. To obtain approval, the owner or operator shall provide the Administrator with the following information:

(1) Application to construct pursuant to § 61.07.

(2) In addition to the information requirements of § 61.07(b)(3), a

(i) Description of waste feed handling and temporary storage.

(ii) Description of process operating conditions.

(iii) Description of the handling and temporary storage of the end product.

(iv) Description of the protocol to be followed when analyzing output materials by transmission electron microscopy.

(3) Performance test protocol, including provisions for obtaining information required under paragraph (b) of this section.

(4) The Administrator may require that a demonstration of the process be performed prior to approval of the application to construct.

(b) Conduct a start-up performance test. Test results shall include:

(1) A detailed description of the types and quantities of nonasbestos material, RACM, and asbestos-containing waste material processed, *e.g.,* asbestos cement products, friable asbestos insulation, plaster, wood, plastic, wire, etc. Test feed is to include the full range of materials that will be encountered in actual operation of the process.

(2) Results of analyses, using polarized light microscopy, that document the asbestos content of the wastes processed.

(3) Results of analyses, using transmission electron microscopy, that document that the output materials are free of asbestos. Samples for analysis are to be collected as 8-hour composite samples (one 200-gram (7-ounce) sample per hour), beginning with the initial introduction of RACM or asbestos-containing waste material and continuing until the end of the performance test.

(4) A description of operating parameters, such as temperature and residence time, defining the full range over which the process is expected to operate to produce nonasbestos (asbestos-free) materials. Specify the limits for each operating parameter within which the process will produce nonasbestos (asbestos-free) materials.

(5) The length of the test.

(c) During the initial 90 days of operation,

(1) Continuously monitor and log the operating parameters identified during start-up performance tests that are intended to ensure the production of nonasbestos (asbestos-free) output material.

(2) Monitor input materials to ensure that they are consistent with the test feed materials described during start-up performance tests in paragraph (b)(1) of this section.

(3) Collect and analyze samples, taken as 10-day composite samples (one 200-gram (7-ounce) sample collected every 8 hours of operation) of all output material for the presence of asbestos. Composite samples may be for fewer than 10 days. Transmission electron microscopy (TEM) shall be used to analyze the output material for the presence of asbestos. During the initial 90-day period, all output materials must be stored on-site until analysis shows the material to be asbestos-free or disposed of as asbestos-containing waste material according to § 61.150.

(d) After the initial 90 days of operation,

(1) Continuously monitor and record the operating parameters identified during start-up performance testing and any subsequent performance testing. Any output produced during a period of deviation from the range of operating conditions established to ensure the production of nonasbestos (asbestos-free) output materials shall be:

(i) Disposed of as asbestos-containing waste material according to § 61.150, or

(ii) Recycled as waste feed during process operation within the established range of operating conditions, or

(iii) Stored temporarily on-site in a leak-tight container until analyzed for asbestos content. Any product material that is not asbestos-free shall be either disposed of as asbestos-containing waste material or recycled as waste feed to the process.

(2) Collect and analyze monthly composite samples (one 200-gram (7-ounce) sample collected every 8 hours of operation) of the output material. Transmission electron microscopy shall be used to analyze the output material for the presence of asbestos.

(e) Discharge no visible emissions to the outside air from any part of the operation, or use the methods specified by § 61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(f) Maintain records on-site and include the following information:

(1) Results of start-up performance testing and all subsequent performance testing, including operating parameters, feed characteristic, and analyses of output materials.

(2) Results of the composite analyses required during the initial 90 days of operation under § 61.155(c).

(3) Results of the monthly composite analyses required under § 61.155(d).

(4) Results of continuous monitoring and logs of process operating parameters required under § 61.155 (c) and (d).

(5) The information on waste shipments received as required in § 61.154(e).

(6) For output materials where no analyses were performed to determine the presence of asbestos, record the

name and location of the purchaser or disposal site to which the output materials were sold or deposited, and the date of sale or disposal.

(7) Retain records required by paragraph (f) of this section for at least 2 years.

(g) Submit the following reports to the Administrator:

(1) A report for each analysis of product composite samples performed during the initial 90 days of operation.

(2) A quarterly report, including the following information concerning activities during each consecutive 3-month period:

(i) Results of analyses of monthly product composite samples.

(ii) A description of any deviation from the operating parameters established during performance testing, the duration of the deviation, and steps taken to correct the deviation.

(iii) Disposition of any product produced during a period of deviation, including whether it was recycled, disposed of as asbestos-containing waste material, or stored temporarily on-site until analyzed for asbestos content.

(iv) The information on waste disposal activities as required in § 61.154(f).

(h) Nonasbestos (asbestos-free) output material is not subject to any of the provisions of this subpart. Output materials in which asbestos is detected, or output materials produced when the operating parameters deviated from those established during the start-up performance testing, unless shown by TEM analysis to be asbestos-free, shall be considered to be asbestos-containing waste and shall be handled and disposed of according to §§ 61.150 and 61.154 or reprocessed while all of the established operating parameters are being met.

[55 FR 48431, Nov. 20, 1990]

§ 61.156 Cross-reference to other asbestos regulations.

In addition to this subpart, the regulations referenced in Table 1 also apply to asbestos and may be applicable to those sources specified in §§ 61.142 through 61.151, 61.154, and 61.155 of this subpart. These cross-references are presented for the reader's information and to promote compliance with the cited regulations.

TABLE 1—CROSS-REFERENCE TO OTHER ASBESTOS REGULATIONS

Agency	CFR citation	Comment
EPA	40 CFR part 763, subpart E	Requires schools to inspect for asbestos and implement response actions and submit asbestos management plans to States. Specifies use of accredited inspectors, air sampling methods, and waste disposal procedures.
	40 CFR part 427	Effluent standards for asbestos manufacturing source categories.
	40 CFR part 763, subpart G	Protects public employees performing asbestos abatement work in States not covered by OSHA asbestos standard.
OSHA	29 CFR 1910.1001	Worker protection measures-engineering controls, worker training, labeling, respiratory protection, bagging of waste, permissible exposure level.
	29 CFR 1926.1101	Worker protection measures for all construction work involving asbestos, including demolition and renovation-work practices, worker training, bagging of waste, permissible exposure level.
MSHA	30 CFR part 56, subpart D	Specifies exposure limits, engineering controls, and respiratory protection measures for workers in surface mines.
	30 CFR part 57, subpart D	Specifies exposure limits, engineering controls, and respiratory protection measures for workers in underground mines.
DOT	49 CFR parts 171 and 172	Regulates the transportation of asbestos-containing waste material. Requires waste containment and shipping papers.

[55 FR 48432, Nov. 20, 1990, as amended at 60 FR 31920, June 19, 1995; 68 FR 54793, Sept. 18, 2003; 69 FR 43324, July 20, 2004]

§ 61.157 Delegation of authority.

(a) In delegating implementation and enforcement authority to a State under section 112(d) of the Act, the authorities contained in paragraph (b) of this section shall be retained by the Administrator and not transferred to a State.

(b) Authorities that will not be delegated to States:

(1) Section 61.149(c)(2)
(2) Section 61.150(a)(4)
(3) Section 61.151(c)
(4) Section 61.152(b)(3)
(5) Section 61.154(d)
(6) Section 61.155(a).

[55 FR 48433, Nov. 20, 1990]

APPENDIX A TO SUBPART M OF PART 61—INTERPRETIVE RULE GOVERNING ROOF REMOVAL OPERATIONS

I. Applicability of the Asbestos NESHAP

1.1. Asbestos-containing material (ACM) is material containing more than one percent asbestos as determined using the methods specified in appendix E, subpart E, 40 CFR part 763, section 1, Polarized Light Microscopy. The NESHAP classifies ACM as either ''friable'' or ''nonfriable''. Friable ACM is ACM that, when dry, can be crumbled, pulverized or reduced to powder by hand pressure. Nonfriable ACM is ACM that, when dry, cannot be crumbled, pulverized or reduced to powder by hand pressure.

1.2. Nonfriable ACM is further classified as either Category I ACM or Category II ACM. Category I ACM and Category II ACM are distinguished from each other by their potential to release fibers when damaged. Category I ACM includes asbestos-containing gaskets, packings, resilient floor coverings, resilient floor covering mastic, and asphalt roofing products containing more than one percent asbestos. Asphalt roofing products which may contain asbestos include built-up roofing; asphalt-containing single ply membrane systems; asphalt shingles; asphalt-containing underlayment felts; asphalt-containing roof coatings and mastics; and asphalt-containing base flashings. ACM roofing products that use other bituminous or resinous binders (such as coal tars or pitches) are also considered to be Category I ACM. Category II ACM includes all other nonfriable ACM, for example, asbestos-cement (A/C) shingles, A/C tiles, and transite boards or panels containing more than one percent asbestos. Generally speaking, Category II ACM is more likely to become friable when damaged than is Category I ACM. The applicability of the NESHAP to Category I and II ACM depends on: (1) the condition of the material at the time of demolition or renovation, (2) the nature of the operation to which the material will be subjected, (3) the amount of ACM involved.

1.3. Asbestos-containing material regulated under the NESHAP is referred to as ''regulated asbestos-containing material'' (RACM). RACM is defined in §61.141 of the NESHAP and includes: (1) friable asbestos-containing material; (2) Category I nonfriable ACM that has become friable; (3) Category I nonfriable ACM that has been or will be sanded, ground, cut, or abraded; or (4) Category II nonfriable ACM that has already been or is likely to become crumbled, pulverized, or reduced to powder. If the coverage threshold for RACM is met or exceeded in a renovation or demolition operation, then all friable ACM in the operation, and in certain situations, nonfriable ACM in the operation, are subject to the NESHAP.

A. Threshold Amounts of Asbestos-Containing Roofing Material

1.A.1. The NESHAP does not cover roofing projects on single family homes or on residential buildings containing four or fewer dwelling units. 40 CFR 61.141. For other roofing renovation projects, if the total asbestos-containing roof area undergoing renovation is less than 160 ft^2, the NESHAP does not apply, regardless of the removal method to be used, the type of material (Category I or II), or its condition (friable versus nonfriable). 40 CFR 61.145(a)(4). However, EPA would recommend the use of methods that damage asbestos-containing roofing material as little as possible. EPA has determined that where a rotating blade (RB) roof cutter or equipment that similarly damages the roofing material is used to remove Category I nonfriable asbestos-containing roofing material, the removal of 5580 ft^2 of that material will create 160 ft^2 of RACM. For the purposes of this interpretive rule, ''RB roof cutter'' means an engine-powered roof cutting machine with one or more rotating cutting blades the edges of which are blunt. (Equipment with blades having sharp or tapered edges, and/or which does not use a rotating blade, is used for ''slicing'' rather than ''cutting'' the roofing material; such equipment is not included in the term ''RB roof cutter''.) Therefore, it is EPA's interpretation that when an RB roof cutter or equipment that similarly damages the roofing material is used to remove Category I nonfriable asbestos-containing roofing material, any project that is 5580 ft^2 or greater is subject to the NESHAP; conversely, it is EPA's interpretation that when an RB roof cutter or equipment that similarly damages the roofing material is used to remove Category I nonfriable asbestos-containing roofing material in a roof removal project that is less than 5580 ft^2, the project is not subject to the NESHAP, except that notification is always required for demolitions. EPA further construes the NESHAP to mean that if slicing or other methods that do not sand, grind, cut or abrade will be used on Category I nonfriable ACM, the NESHAP does not apply, regardless of the area of roof to be removed.

1.A.2. For asbestos cement (A/C) shingles (or other Category II roofing material), if the area of the roofing material to be removed is at least 160 ft^2 and the removal methods will

crumble, pulverize, reduce to powder, or contaminate with RACM (from other ACM that has been crumbled, pulverized or reduced to powder) 160 ft^2 or more of such roofing material, the removal is subject to the NESHAP. Conversely, if the area of the A/C shingles (or other Category II roofing materials) to be removed is less than 160 ft^2, the removal is not subject to the NESHAP regardless of the removal method used, except that notification is always required for demolitions. 40 CFR 61.145(a). However, EPA would recommend the use of methods that damage asbestos-containing roofing material as little as possible. If A/C shingles (or other Category II roofing materials) are removed without 160 ft^2 or more of such roofing material being crumbled, pulverized, reduced to powder, or contaminated with RACM (from other ACM that has been crumbled, pulverized or reduced to powder), the operation is not subject to the NESHAP, even where the total area of the roofing material to be removed exceeds 160 ft^2; provided, however, that if the renovation includes other operations involving RACM, the roof removal operation is covered if the total area of RACM from all renovation activities exceeds 160 ft^2. *See* the definition of regulated asbestos-containing material (RACM), 40 CFR 61.141.

1.A.3. Only roofing material that meets the definition of ACM can qualify as RACM subject to the NESHAP. Therefore, to determine if a removal operation that meets or exceeds the coverage threshold is subject to the NESHAP, any suspect roofing material (*i.e.* roofing material that may be ACM) should be tested for asbestos. If any such roofing material contains more than one percent asbestos and if the removal operation is covered by the NESHAP, then EPA must be notified and the work practices in §61.145(c) must be followed. In EPA's view, if a removal operation involves at least the threshold level of suspect material, a roofing contractor may choose not to test for asbestos if the contractor follows the notification and work practice requirements of the NESHAP.

B. A/C Shingle Removal (Category II ACM Removal)

1.B.1. A/C shingles, which are Category II nonfriable ACM, become regulated ACM if the material has a high probability of becoming or has become crumbled, pulverized or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. 40 CFR 61.141. However, merely breaking an A/C shingle (or any other category II ACM) that is not friable may not necessarily cause the material to become RACM. A/C shingles are typically nailed to buildings on which they are attached. EPA believes that the extent of breakage that will normally result from carefully removing A/C shingles and lowering the shingles to the ground will not result in crumbling, pulverizing or reducing the shingles to powder. Conversely, the extent of breakage that will normally occur if the A/C shingles are dropped from a building or scraped off of a building with heavy machinery would cause the shingles to become RACM. EPA therefore construes the NESHAP to mean that the removal of A/C shingles that are not friable, using methods that do not crumble, pulverize, or reduce the A/C shingles to powder (such as pry bars, spud bars and shovels to carefully pry the material), is not subject to the NESHAP provided that the A/C shingles are properly handled during and after removal, as discussed in this paragraph and the asbestos NESHAP. This interpretation also applies to other Category II nonfriable asbestos-containing roofing materials.

C. Cutting vs. Slicing and Manual Methods for Removal of Category I ACM

1.C.1. Because of damage to the roofing material, and the potential for fiber release, roof removal operations using rotating blade (RB) roof cutters or other equipment that sand, grind, cut or abrade the roof material are subject to the NESHAP. As EPA interprets the NESHAP, the use of certain manual methods (using equipment such as axes, hatchets, or knives, spud bars, pry bars, and shovels, but not saws) or methods that slice, shear, or punch (using equipment such as a power slicer or power plow) does not constitute ''cutting, sanding, grinding or abrading.'' This is because these methods do not destroy the structural matrix or integrity of the material such that the material is crumbled, pulverized or reduced to powder. Hence, it is EPA's interpretation that when such methods are used, assuming the roof material is not friable, the removal operation is not subject to the regulation.

1.C.2. Power removers or power tear-off machines are typically used to pry the roofing material up from the deck after the roof membrane has been cut. It is EPA's interpretation that when these machines are used to pry roofing material up, their use is not regulated by the NESHAP.

1.C.3. As noted previously, the NESHAP only applies to the removal of asbestos-containing roofing materials. Thus, the NESHAP does not apply to the use of RB cutters to remove non-asbestos built up roofing (BUR). On roofs containing some asbestos-containing and some non-asbestos-containing materials, coverage under the NESHAP depends on the methods used to remove each type of material in addition to other coverage thresholds specified above. For example, it is not uncommon for existing roofs to be made of non-asbestos BUR and base flashings that do contain asbestos. In that situation, EPA construes the

NESHAP to be inapplicable to the removal of the non-asbestos BUR using an RB cutter so long as the RB cutter is not used to cut 5580 ft^2 or more of the asbestos-containing base flashing or other asbestos-containing material into sections. In addition, the use of methods that slice, shear, punch or pry could then be used to remove the asbestos flashings and not trigger coverage under the NESHAP.

II. Notification

2.1. Notification for a demolition is always required under the NESHAP. However, EPA believes that few roof removal jobs constitute ''demolitions'' as defined in the NESHAP (§61.141). In particular, it is EPA's view that the removal of roofing systems (i.e., the roof membrane, insulation, surfacing, coatings, flashings, mastic, shingles, and felt underlayment), when such removal is not a part of a demolition project, constitutes a ''renovation'' under the NESHAP. If the operation is a renovation, and Category I roofing material is being removed using either manual methods or slicing, notification is not required by the NESHAP. If Category II material is not friable and will be removed without crumbling, pulverizing, or reducing it to powder, no notification is required. Also, if the renovation involves less than the threshold area for applicability as discussed above, then no notification is required. However, if a roof removal meets the applicability and threshold requirements under the NESHAP, then EPA (or the delegated agency) must be notified in advance of the removal in accordance with the requirements of §61.145(b), as follows:

- Notification must be given in writing at least 10 working days in advance and must include the information in §61.145(b)(4), except for emergency renovations as discussed below.
- The notice must be updated as necessary, including, for example, when the amount of asbestos-containing roofing material reported changes by 20 percent or more.
- EPA must be notified if the start date of the roof removal changes. If the start date of a roof removal project is changed to an earlier date, EPA must be provided with a written notice of the new start date at least 10 working days in advance. If the start date changes to a later date, EPA must be notified by telephone as soon as possible before the original start date and a written notice must be sent as soon as possible.
- For emergency renovations (as defined in §61.141), where work must begin immediately to avoid safety or public health hazards, equipment damage, or unreasonable financial burden, the notification must be postmarked or delivered to EPA as soon as possible, but no later than the following work day.

III. Emission Control Practices

A. Requirements To Adequately Wet and Discharge No Visible Emission

3.A.1. The principal controls contained in the NESHAP for removal operations include requirements that the affected material be adequately wetted, and that asbestos waste be handled, collected, and disposed of properly. The requirements for disposal of waste materials are discussed separately in section IV below. The emission control requirements discussed in this section III apply only to roof removal operations that are covered by the NESHAP as set forth in Section I above.

3.A.2. For any operation subject to the NESHAP, the regulation (§§61.145(c)(2)(i), (3), (6)(i)) requires that RACM be adequately wet (as defined in §61.141) during the operation that damages or disturbs the asbestos material until collected for disposal.

3.A.3. When using an RB roof cutter (or any other method that sands, grinds, cuts or abrades the roofing material) to remove Category I asbestos-containing roofing material, the emission control requirements of §61.145(c) apply as discussed in Section I above. EPA will consider a roof removal project to be in compliance with the ''adequately wet'' and ''discharge no visible emission'' requirements of the NESHAP if the RB roof cutter is equipped and operated with the following: (1) a blade guard that completely encloses the blade and extends down close to the roof surface; and (2) a device for spraying a fine mist of water inside the blade guard, and which device is in operation during the cutting of the roof.

B. Exemptions From Wetting Requirements

3.B.1. The NESHAP provides that, in certain instances, wetting may not be required during the cutting of Category I asbestos roofing material with an RB roof cutter. If EPA determines in accordance with §61.145(c)(3)(i), that wetting will unavoidably damage the building, equipment inside the building, or will present a safety hazard while stripping the ACM from a facility component that remains in place, the roof removal operation will be exempted from the requirement to wet during cutting. EPA must have sufficient written information on which to base such a decision. Before proceeding with a dry removal, the contractor must have received EPA's written approval. Such exemptions will be made on a case-by-case basis.

3.B.2. It is EPA's view that, in most instances, exemptions from the wetting requirements are not necessary. Where EPA grants an exemption from wetting because of the potential for damage to the building, damage to equipment within the building or a safety hazard, the NESHAP specifies alternative control methods (§61.145(c)(3)(i)(B)).

Alternative control methods include (a) the use of local exhaust ventilation systems that capture the dust, and do not produce visible emissions, or (b) methods that are designed and operated in accordance with the requirements of §61.152, or (c) other methods that have received the written approval of EPA. EPA will consider an alternative emission control method in compliance with the NESHAP if the method has received written approval from EPA and the method is being implemented consistent with the approved procedures (§61.145(c)(3)(ii) or §61.152(b)(3)).

3.B.3. An exemption from wetting is also allowed when the air or roof surface temperature at the point of wetting is below freezing, as specified in §61.145(c)(7). If freezing temperatures are indicated as the reason for not wetting, records must be kept of the temperature at the beginning, middle and end of the day on which wetting is not performed and the records of temperature must be retained for at least 2 years. 42 CFR §61.145(c)(7)(iii). It is EPA's interpretation that in such cases, no written application to, or written approval by the Administrator is needed for using emission control methods listed in §61.145(c)(3)(i)(B), or alternative emission control methods that have been previously approved by the Administrator. However, such written application or approval is required for alternative emission control methods that have not been previously approved. Any dust and debris collected from cutting must still be kept wet and placed in containers. All of the other requirements for notification and waste disposal would continue to apply as described elsewhere in this notice and the Asbestos NESHAP.

C. Waste Collection and Handling

3.C.1. It is EPA's interpretation that waste resulting from slicing and other methods that do not cut, grind, sand or abrade Category I nonfriable asbestos-containing roofing material is not subject to the NESHAP and can be disposed of as nonasbestos waste. EPA further construes the NESHAP to provide that if Category II roofing material (such as A/C shingles) is removed and disposed of without crumbling, pulverizing, or reducing it to powder, the waste from the removal is not subject to the NESHAP waste disposal requirements. EPA also interprets the NESHAP to be inapplicable to waste resulting from roof removal operations that do not meet or exceed the coverage thresholds described in section I above. Of course, other State, local, or Federal regulations may apply.

3.C.2. It is EPA's interpretation that when an RB roof cutter, or other method that similarly damages the roofing material, is used to cut Category I asbestos containing roofing material, the damaged material from the cut (the sawdust or debris) is considered asbestos containing waste subject to §61.150 of the NESHAP, provided the coverage thresholds discussed above in section 1 are met or exceeded. This sawdust or debris must be disposed of at a disposal site operated in accordance with the NESHAP. It is also EPA's interpretation of the NESHAP that if the remainder of the roof is free of the sawdust and debris generated by the cutting, or if such sawdust or debris is collected as discussed below in paragraphs 3.C.3, 3.C.4, 3.C.5 and 3.C.6, the remainder of the roof can be disposed of as nonasbestos waste because it is considered to be Category I nonfriable material (as long as the remainder of the roof is in fact nonasbestos material or if it is Category I asbestos material and the removal methods do not further sand, grind, cut or abrade the roof material). EPA further believes that if the roof is not cleaned of such sawdust or debris, *i.e.*, it is contaminated, then it must be treated as asbestos-containing waste material and be handled in accordance with §61.150.

3.C.3. In order to be in compliance with the NESHAP while using an RB roof cutter (or device that similarly damages the roofing material) to cut Category I asbestos containing roofing material, the dust and debris resulting from the cutting of the roof should be collected as soon as possible after the cutting operation, and kept wet until collected and placed in leak-tight containers. EPA believes that where the blade guard completely encloses the blade and extends down close to the roof surface and is equipped with a device for spraying a fine mist of water inside the blade guard, and the spraying device is in operation during the cutting, most of the dust and debris from cutting will be confined along the cut. The most efficient methods to collect the dust and debris from cutting are to immediately collect or vacuum up the damaged material where it lies along the cut using a filtered vacuum cleaner or debris collector that meets the requirements of 40 CFR 61.152 to clean up as much of the debris as possible, or to gently sweep up the bulk of the debris, and then use a filtered vacuum cleaner that meets the requirements of 40 CFR 61.152 to clean up as much of the remainder of the debris as possible. On smooth surfaced roofs (nonaggregate roofs), sweeping up the debris and then wet wiping the surface may be done in place of using a filtered vacuum cleaner. It is EPA's view that if these decontamination procedures are followed, the remaining roofing material does not have to be collected and disposed of as asbestos waste. Additionally, it is EPA's view that where such decontamination procedures are followed, if the remaining portions of the roof are non-asbestos or Category I nonfriable asbestos material, and if the remaining portions are removed using removal methods that slice, shear, punch or

pry, as discussed in section 1.C above, then the remaining portions do not have to be collected and disposed of as asbestos waste and the NESHAP's no visible emissions and adequately wet requirements are not applicable to the removal of the remaining portions. In EPA's interpretation, the failure of a filtered vacuum cleaner or debris collector to collect larger chunks or pieces of damaged roofing material created by the RB roof cutter does not require the remaining roofing material to be handled and disposed of as asbestos waste, provided that such visible chunks or pieces of roofing material are collected (e.g. by gentle sweeping) and disposed of as asbestos waste. Other methods of decontamination may not be adequate, and should be approved by the local delegated agency.

3.C.4. In EPA's interpretation, if the debris from the cutting is not collected immediately, it will be necessary to lightly mist the dust or debris, until it is collected, as discussed above, and placed in containers. The dust or debris should be lightly misted frequently enough to prevent the material from drying, and to prevent airborne emissions, prior to collection as described above. It is EPA's interpretation of the NESHAP that if these procedures are followed, the remaining roofing material does not have to be collected and disposed of as asbestos waste, as long as the remaining roof material is in fact nonasbestos material or if it is Category I asbestos material and the removal methods do not further sand, grind, cut or abrade the roof material.

3.C.5. It is EPA's interpretation that, provided the roofing material is not friable prior to the cutting operation, and provided the roofing material has not been made friable by the cutting operation, the appearance of rough, jagged or damaged edges on the remaining roofing material, due to the use of an RB roof cutter, does not require that such remaining roofing material be handled and disposed of as asbestos waste. In addition, it is also EPA's interpretation that if the sawdust or debris generated by the use of an RB roof cutter has been collected as discussed in paragraphs 3.C.3, 3.C.4 and 3.C.6, the presence of dust along the edge of the remaining roof material does not render such material ''friable'' for purposes of this interpretive rule or the NESHAP, provided the roofing material is not friable prior to the cutting operation, and provided that the remaining roofing material near the cutline has not been made friable by the cutting operation. Where roofing material near the cutline has been made friable by the use of the RB cutter (*i.e.* where such remaining roofing material near the cutline can be crumbled, pulverized or reduced to powder using hand pressure), it is EPA's interpretation that the use of an encapsulant will ensure that such friable material need not be treated or disposed of as asbestos containing waste material. The encapsulant may be applied to the friable material after the roofing material has been collected into stacks for subsequent disposal as nonasbestos waste. It is EPA's view that if the encapsulation procedure set forth in this paragraph is followed in operations where roofing material near the cutline has been rendered friable by the use of an RB roof cutter, and if the decontamination procedures set forth in paragraph 3.C.3 have been followed, the NESHAP's no visible emissions and adequately wet requirements would be met for the removal, handling and disposal of the remaining roofing material.

3.C.6. As one way to comply with the NESHAP, the dust and debris from cutting can be placed in leak-tight containers, such as plastic bags, and the containers labeled using warning labels required by OSHA (29 CFR 1926.58). In addition, the containers must have labels that identify the waste generator (such as the name of the roofing contractor, abatement contractor, and/or building owner or operator) and the location of the site at which the waste was generated.

IV. Waste Disposal

A. Disposal Requirements

4.A.1. Section 61.150(b) requires that, as soon as is practical, all collected dust and debris from cutting as well as any contaminated roofing squares, must be taken to a landfill that is operated in accordance with §61.154 or to an EPA-approved site that converts asbestos waste to nonasbestos material in accordance with §61.155. During the loading and unloading of affected waste, asbestos warning signs must be affixed to the vehicles.

B. Waste Shipment Record

4.B.1. For each load of asbestos waste that is regulated under the NESHAP, a waste shipment record (WSR) must be maintained in accordance with §61.150(d). Information that must be maintained for each waste load includes the following:

- Name, address, and telephone number of the waste generator
- Name and address of the local, State, or EPA regional office responsible for administering the asbestos NESHAP program
- Quantity of waste in cubic meters (or cubic yards)
- Name and telephone number of the disposal site operator
- Name and physical site location of the disposal site
- Date transported
- Name, address, and telephone number of the transporter(s)
- Certification that the contents meet all government regulations for transport by highways.

4.B.2. The waste generator is responsible for ensuring that a copy of the WSR is delivered to the disposal site along with the waste shipment. If a copy of the WSR signed by the disposal site operator is not returned to the waste generator within 35 days, the waste generator must contact the transporter and/or the disposal site to determine the status of the waste shipment. 40 CFR 61.150(d)(3). If the signed WSR is not received within 45 days, the waste generator must report, in writing, to the responsible NESHAP program agency and send along a copy of the WSR. 40 CFR 61.150(d)(4). Copies of WSRs, including those signed by the disposal site operator, must be retained for at least 2 years. 40 CFR 61.150(d)(5).

V. Training

5.1. For those roof removals that are subject to the NESHAP, at least one on-site supervisor trained in the provisions of the NESHAP must be present during the removal of the asbestos roofing material. 40 CFR 61.145(c)(8). In EPA's view, this person can be a job foreman, a hired consultant, or someone who can represent the building owner or contractor responsible for the removal. In addition to the initial training requirement, a refresher training course is required every 2 years. The NESHAP training requirements became effective on November 20, 1991.

5.2. Asbestos training courses developed specifically to address compliance with the NESHAP in roofing work, as well as courses developed for other purposes can satisfy this requirement of the NESHAP, as long as the course covers the areas specified in the regulation. EPA believes that Asbestos Hazard Emergency Response Act (AHERA) training courses will, for example, satisfy the NESHAP training requirements. However, nothing in this interpretive rule or in the NESHAP shall be deemed to require that roofing contractors or roofing workers performing operations covered by the NESHAP must be trained or accredited under AHERA, as amended by the Asbestos School Hazard Abatement Reauthorization Act (ASHARA). Likewise, state or local authorities may independently impose additional training, licensing, or accreditation requirements on roofing contractors performing operations covered by the NESHAP, but such additional training, licensing or accreditation is not called for by this interpretive rule or the federal NESHAP.

5.3. For removal of Category I asbestos containing roofing material where RB roof cutters or equipment that similarly damages the asbestos-containing roofing material are used, the NESHAP training requirements (§ 61.145(c)(8)) apply as discussed in Section I above. It is EPA's intention that removal of Category I asbestos-containing roofing material using hatchets, axes, knives, and/or the use of spud bars, pry bars and shovels to lift the roofing material, or similar removal methods that slice, punch, or shear the roof membrane are not subject to the training requirements, since these methods do not cause the roof removal to be subject to the NESHAP. Likewise, it is EPA's intention that roof removal operations involving Category II nonfriable ACM are not subject to the training requirements where such operations are not subject to the NESHAP as discussed in section I above.

[59 FR 31158, June 17, 1994, as amended at 60 FR 31920, June 19, 1995]

Subpart N—National Emission Standard for Inorganic Arsenic Emissions From Glass Manufacturing Plants

SOURCE: 51 FR 28025, Aug. 4, 1986, unless otherwise noted.

§ 61.160 Applicability and designation of source.

(a) The source to which this subpart applies is each glass melting furnace that uses commercial arsenic as a raw material. This subpart does not apply to pot furnaces.

(b) Rebricking is not considered construction or modification for the purposes of § 61.05(a).

§ 61.161 Definitions.

The terms used in this subpart are defined in the Clean Air Act, in § 61.02, or in this section as follows:

Arsenic-containing glass type means any glass that is distinguished from other glass solely by the weight percent of arsenic added as a raw material and by the weight percent of arsenic in the glass produced. Any two or more glasses that have the same weight percent of arsenic in the raw materials as well as in the glass produced shall be considered to belong to one arsenic-containing glass type, without regard to the recipe used or any other characteristics of the glass or the method of production.

By-pass the control device means to operate the glass melting furnace without operating the control device to which that furnace's emissions are directed routinely.

Commercial arsenic means any form of arsenic that is produced by extraction

Chapter 13: EPA Guidance Documents

EPA GUIDANCE DOCUMENTS

Sections:

100 Commonly Asked Questions about the New AHERA Asbestos-in-Schools Rule

Asbestos-in-Schools: A Guide to New Federal Requirements for Local Education Agencies

Asbestos in Schools: Evaluation of the Asbestos Hazard Emergency Response Act (AHERA); A Summary Report

Asbestos in Schools: Evaluation of the Asbestos Hazard Emergency Response Act (AHERA); A Fact Sheet

A Guide to Performing Reinspections under the Asbestos Hazard Emergency Response Act (AHERA)

EPA Interpretations on AHERA and NESHAP Regulations

Common Questions on the Asbestos NESHAP

NOTE: This document was scanned from the original and has been carefully checked for errors. Formatting was changed slightly to keep answers and questions together. Therefore there are some blank pages that are marked as “This page intentionally left blank”.

100 COMMONLY ASKED QUESTIONS

ABOUT THE

NEW AHERA ASBESTOS-IN-SCHOOLS RULE

Introduction

This is a collection of questions commonly asked about the new Asbestos-Containing materials in Schools rule, promulgated by the U.S. Environmental Protection Agency in October 1987 under the Asbestos Hazard Emergency Response Act (AHERA) of 1986.

Many questions are answered directly and completely, as they are clearly addressed by provisions of the rule. Other questions, however, must be answered more generally, for the Agency's response to the question may change depending upon the specific circumstances in a particular school. Schools, of course, may also be subject to State or local asbestos management and abatement requirements, not reflected in this document.

This "100 Commonly Asked Questions" document is offered as a guide to help school officials, training providers and accredited persons better understand the new AHERA schools rule. If you have further questions, please contact the EPA Regional Asbestos Coordinator who serves your area or call the EPA Toxics Hotline in Washington, D.C., at 202/554-1404.

Office of Toxic Substances
Office of Pesticides and Toxic Substances
U.S. Environmental Protection Agency
Washington, D.C. 20460
May 1988

100 Commonly Asked Questions About the New

AHERA Asbestos-in-Schools Rule

Table of Contents

I.	Effective Dates	1
II.	Buildings Covered by the Rule	6
III.	General LEA Responsibilities	12
IV.	Inspections, Reinspections, and Periodic Surveillance	16
V.	Exclusions	25
VI.	Response Actions	26
VII.	Operations and Maintenance **(O&M)**	29
VIII	Custodial and Maintenance Worker Training	32
IX.	Management Plans	35
X.	Recordkeeping	42
XI.	Accreditation	43
XII.	TEM, PCM, Sampling and Analysis	50
XIII.	Warning Labels	56
XIV.	Transport and Disposal	58
XV.	State Waivers	59
XVI.	Miscellaneous	60

ACRONYMS USED IN THIS GUIDE

ACBM	Asbestos-containing Building Materials
ACM	Asbestos-containing Materials
AHERA	Asbestos Hazard Emergency Response Act
LEA	Local Education Agency
NESHAP	National Emission Standards for Hazardous Air Pollutants
O&M	Operations and Maintenance
PCM	Phase Contrast Microscopy
TEM	Transmission Electron Microscopy

I. EFFECTIVE DATES

Questions 1-7

On what date does each of the following requirements become effective?

— the management plan

— specific O&M work practices

— O & M training

— periodic surveillance

— warning labels

— selection of an LEA's Designated Person

— management plan availability for public review

Answers:

— The Management Plan--The effective date of the management plan is the date on which the LEA begins to implement its plan. According to AHERA § 203(i), this can be no later than July 9, 1989.

— O&M Work Practices--After December 14, 1987, LEAs must abide by the operations and maintenance requirements in § 763.91, whenever any of these activities need to be performed.

— O &M Training--(i) The 14-hour training requirement (see section 763.92(a)(2)) is for specific members of the custodial and maintenance staff who conduct activities that may disturb ACBM. After December 14, 1987, only custodial and maintenance staff who have had the 14-hour training are permitted to conduct such activities.

(ii)--The effective date for the 2-hour general awareness training is defined in the rule. Section 763.92 (a)(1) states that the LEA shall

ensure, prior to the implementation of the operations and maintenance provisions of the management plan (emphasis added), that all members of its maintenance and custodial staff who may work in a building that contains ACBM receive awareness training of at least 2 hours." As outlined in the rule, therefore, all members of the custodial and maintenance staff must have awareness training on or before July 9, 1989.

— Periodic Surveillance--In § 763.92(b)(1), the rule states that "... at least once every 6 months-after a management plan is in effect, each LEA shall conduct periodic surveillance…" in its buildings. Thus if a management plan was put into effect on July 9, 1989, for example, the LEA would have to conduct its first periodic surveillance by January 9, 1990.

— Warning Labels--Section 763.95(a) states that the LEA "... shall attach a warning label immediately adjacent to any friable and nonfriable ..." ACBM found in routine maintenance areas. As a result, if ACBM is identified in routine maintenance areas, the material must be labeled as soon as possible thereafter. (For material identified under the 1982 rule, these materials should have been labeled as of December 14, 1987.) After the results of the inspections conducted pursuant to the 1987 schools rule are known, all ACBM identified in routine maintenance areas must be labeled.

— Selection of an LEA's Designated Person--Section763.84 requires that LEAs designate a person to ensure that the actions of persons who conduct a variety of activities, including O&M,

inspections and response actions, are carried out in accordance with the rule. As a result, LEAs must select a Designated Person as soon as possible to ensure these activities are done properly.

— Management Plan Availability for Public Review--

Section 763.93(g)(1) states that "... upon submission of a management plan to the Governor for review, a local education agency shall keep a copy of the plan in its administrative office." This means that the LEA must have the plan available for public review (including parents and staff) in its administrative office on the day on which it is submitted. Each individual school shall have a copy of the school's plan available on the same day.

Question 8: When must LEAs take certain response actions for areas of significantly damaged surfacing ACM and damaged or significantly damaged thermal system insulation ACM?

Answer: Several conditions listed in § 763.90 necessitate a quick response. For example, a room with significantly damaged friable surfacing ACM must be immediately isolated and access to it restricted, if these measures are needed to protect human health and the environment. In addition, damaged or significantly damaged thermal system insulation must be at least repaired and then maintained by the LEA in an intact state and undamaged condition. As a result, as soon as a management planner and LEA determine that these conditions exist, the LEA must initiate steps to take action. The LEA cannot wait until July 9, 1989 to address these hazards.

Question 9: The AHERA statute requires schools to begin implementing the management plan by July 9, 1989. Exactly what must be begun by this date?

Answer: July 9, 1989, is the latest date on which any LEA can begin to implement its management plan. The formal operations and maintenance plan designed for a particular school (for example, a routine cleaning schedule for that school), and the response action schedule with completion dates, must be implemented no later than July 9, 1989. A schedule for an abatement project, for example, will become effective on July 9, 1989, even though the project is

not scheduled until later. In addition, the July 9, 1989, date is the latest date on which schools can begin their periodic surveillance and reinspection intervals. In other words, periodic surveillance must be performed within 6 months of July 9 if a school to implement its management plan on this date.

II. BUILDINGS COVERED BY THE RULE

Question 10: A school district leases space from a nonschool group (corporation, YMCA, etc.). Who is responsible, the school district or the landlord for complying with the AHERA rule?

Answer: The LEA is responsible for complying with the rule. There are several references to school buildings under the authority of an LEA in AHERA (see sections 203(b),(c),(d), (e),(f) and (i)). This phrase clearly covers buildings owned by the LEA. It also includes buildings leased by LEAS since LEAS control access to these buildings, how these buildings are used by occupants (e.g., classes in certain rooms, administrative offices in others), the furnishings within the buildings, and the scheduling of school-related activities. As a result, an LEA which leases a school building exercises authority with respect to the use of the building as a school. Section 763.85(a) of the rule states that leased school buildings are covered and that the LEA is responsible.

Question 11: If an LEA owns a building but does not currently use it as a school, must it be inspected by October 12, 1988? (For example, what if changes in school population have forced a school district to close a school and to rent the building out to a religious group for services?)

Answer: The LEA doesn't have to inspect such a building by October 12, 1988. However, § 763.85(a)(1) indicates that LEAs shall inspect each school building that they lease, own, or otherwise use. As a result, before an LEA decides to use a building already leased or owned as a school building, the LEA must first inspect the building.

In addition, § 763.93(a)(3) states, "If a local education agency begins to use a building as a school after October 12, 1988, the local education agency shall submit a management plan for the school [to the State] prior to its use as a school."

Question 12: If an LEA obtains a building in April of 1990, for example, how soon must the LEA inspect it?

Answer: Section 763.85(a)(2) addresses this issue. "Any building leased or acquired on or after October 12, 1988, that is to be used as a school building, shall be inspected as described in (a)(3) and (4) of this section prior to its use as a school building."

Question 13: A school building burns down. An LEA wants to use a local community center for 6 months due to the emergency. Does this temporary school building have to be inspected?

Answer: Section 763.85(a)(2) states that, "In the event that emergency use of an uninspected building as a school building is necessitated, such buildings shall be inspected within 30 days after commencement of such use."

Question 14: Will for profit schools be required to comply with the EPA rule?

Answer: No. Section 202(7) of AHERA specifically refers only to non-profit schools. As a result, schools operated on a for profit basis are not covered.

Question 15: Are State-run schools (e.g., prison schools, schools for the handicapped, etc.) covered by AHERA?

Answer: That usually depends on State law. AHERA section 202 states that "... the term 'school' means any elementary or secondary school as defined in section 198 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2854)." The definition to which this refers states: "the term 'elementary school' means a day or residential school which provides elementary education, as determined under State law, and the term secondary school means a day or residential school which provides secondary education, as determined under State law, except that it does not include any education provided beyond grade 12..." (20 U.S.C. 2854) Thus, individual State law addresses whether a State-run school is covered as an elementary or secondary school.

Question 16:	Several high school students take advanced placement classes with college freshmen at the State University. Does a classroom or building that these students frequent have to be inspected?
Answer:	No. AHERA § 203 refers to school buildings under the authority of an LEA. These classrooms are not under an LEA's authority, and therefore are not covered.
Question 17:	Each year the local high school has its annual play at a local Community center. Rehearsals and the actual shows run for over 2 months. Is this building covered?
Answer:	If the local community center is not under the authority of the LEA, This building is not covered.
Question 18:	Are churches or sanctuaries that are under the LEA's authority, which are attended by students for religious purposes during normal school hours, required to be inspected?
Answer:	No. However, if a church is under the authority of an LEA and is used for other school instruction (e.g., math, spelling, etc.) as part of the school's curriculum, then it must be inspected and included in the management plan.

Question 19: Are the school district's administrative offices (such as the Board of Education or the Superintendent's Office) covered by AHERA, even if students never attend classes in these buildings?

Answer: Yes. Among the structures covered in the definition of "school building" in AHERA (section 202) and the rule (section 763.83) would be any other facility used for the instruction or housing of students or for the administration of educational or research programs (emphasis added)."

Question 20; Are the school system's maintenance or storage facilities (e.g., bus garage or warehouse) covered by the rule?

Answer: In general, the answer is yes. Section 202 of AHERA and section 763.83 of the rule define "school building" to include "... 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)." Paragraphs (1), (2), and (3) cover classrooms, libraries, gymnasiums, and administrative offices. For purposes of the rule, the facility is deemed essential if the LEA uses the facility. Vacant facilities of this type (i.e., empty storage facilities, empty warehouses, etc.) are not deemed essential, and therefore are exempt, because they are not used. Once the LEA begins to use these facilities, however, they become essential and must be addressed as required by the rule.

Question 21: An LEA has a school building which is no longer being used and is scheduled for demolition. Is the LEA required to have an accredited contractor and workers do the abatement work which is required under NESHAPS?

Answer: Not under AHERA, although individual States or localities may have other statutes. A building that is abandoned and scheduled for demolition is not covered by AHERA since the building is no longer being used as a school.

Question 22: Several LEAs bus students to bowling alleys or YMCA swimming pools and gymnasiums for physical education classes. Must LEAs inspect these buildings?

Answer: No. These buildings are not covered by the rule.

Question 23: A school uses a single room in a nonschool building on a regular basis as a classroom for elementary and secondary education purposes during regular school hours. Is the room covered by the rule? Is the entire building also covered?

Answer: The single room used by the school on a regular basis as a classroom is covered by the rule. The rest of the building is not covered.

III. GENERAL LEA RESPONSIBILITIES

Question 24: Sections 763.84(g)(2) and 763.93(e)(3)(4) refer to, The"... trained person designated by the LEA to implement the management plan…" The Rule does not indicate what specific training course is required to qualify the person(s) responsible for implementing the management plan. Should this person be "accredited" and would it be as a management planner or contractor/supervisor or project designer? What would constitute adequate training?

Answer: The LEA's designated person is not required to be accredited; however, he or she must have some minimal training. Section 763.84(g)(2) lists the training requirements. No specific hours of training were required since a designated person in a small LEA with only nonfriable ACBM may not need to have as much training as the designated person for a large city school system. Section 763.93(e)(4) requires, however, that the LEA list the course name, dates, and hours of training undertaken by the designated person.

Question 25: Can an LEA designate a committee instead of one person to coordinate asbestos programs for an LEA?

Answer: No. Section 763.84(g)(1) requires each LEA to designate "a person". This person or the LEA**,** however, may choose to appoint an advisory committee.

Question 26:	Can a group of LEAs share a Designated Person?
Answer:	Yes.
Question 27:	Must an LEA's Designated Person be an employee of the LEA, or can this person be an outside consultant, available on a part-time basis? Does the Designated Person have to be "on-site" at the LEA, or can he/she be located at another location?
Answer:	The Designated Person does not have to be an LEA employee. Section 763.80(a) allows LEAs to delegate the duties of their Designated Person under the rule, but the LEAs remain responsible for the proper performance of those duties. The Designated Person does not have to be on-site at the LEA.
Question 28:	Many LEAs intend to select certain person(s) who are permanent employees of the district to become accredited inspectors, management planners, project designers, contractor/supervisors and abatement workers. Does EPA foresee any problems with this approach, since S 763.84(h) cautions against "conflict of interest" among accredited personnel?
Answer:	The conflict of interest provision in the rule pertains to outside contractors who serve in two or more capacities. (see rule preamble discussion, p. 41836. LEAs have the option to use their own employees to carry out all tasks.

Question 29: What is the definition of school as contained in Section 198 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2854)?

Answer: The following excerpts include key terms from the 1965 Act. LEAs should contact their appropriate State agency for specifics on State law.

> 20 U.S.C. 3381, Elementary and Secondary Education Act of 1965 (c) The term "elementary school" means a day or residential school which provides elementary education, as determined under State law.
>
> (f) The term "local educational agency" means a public board of education or other public authority legally constituted within a State for either administrative control or direction of, or to perform a service function for, public elementary or secondary schools in a city, county, township, school district, or other political subdivision of a State, or such combination of school districts or counties as are recognized in a State as an administrative agency for its public elementary or secondary schools. The term also includes any other public institution or agency having administrative control and direction of a public elementary or secondary school.

(h) The term "secondary school" means a day or residential school which provides secondary education, as determined under State law, except that it does not include any education provided beyond grade 12.

20 U.S.C. 2854

(7) The term "elementary school" means a day or residential school which provides elementary education, as determined under State law, and the term "secondary school" means a day or residential school which provides secondary education, as determined under State law, except that it does not include any education provided beyond grade 12.

IV. INSPECTIONS, REINSPECTIONS, AND PERIODIC SURVEILLANCE

Question 30: What specifically must be inspected, and what need not be inspected? Where do you draw the line? Determining the location of every material that may contain asbestos may be impossible. Should an inspector tear up the school building (e.g., knock down walls) to find asbestos?

Answer: EPA will require LEAs to ensure that accredited inspectors conduct a thorough and complete inspection. However, in most cases, EPA does not intend that the accredited inspector undertake destructive steps (e.g., tearing down a wall) in an attempt to locate ACBM.

An accredited inspector is expected to take reasonable steps to locate ACBM. Specifically, an accredited inspector is expected to conduct a thorough visual inspection, examine all concealed accessible areas (e.g., above drop ceilings, inside ventilation shafts, etc.) and carefully review building plans and use his or her own knowledge to determine if ACBM was used in areas that are inaccessible. Building plans may provide some helpful information about where to look for ACBM, but they are not a substitute for a thorough inspection.

An accredited inspector must answer two questions with respect to inaccessible areas:

1) Is there reason to suspect that ACBM is present?

2) Is there reason to believe fibers could be released from ACBM and carried from the area?

If the answer to both questions is ‘yes”, the inaccessible area must be examined. If the answer to question number one is “no”, no further action is needed. If the answer to question number one is “yes”, but question number two is answered “no”, the LEA should inventory the material as assumed ACBM and keep track of the material during periodic surveillance and reinspection.

The second question above is important. A key aspect of most inspector training courses is understanding how the air circulates inside a building. If air circulates through an area that contains asbestos, asbestos fibers could be carried to the rest of the building.

Question 31: Does nonfriable surfacing and miscellaneous ACM have to be assessed? What about thermal system insulation?

Answer: Nonfriable miscellaneous and nonfriable surfacing ACBM do not have to be assessed. However, thermal system insulation with no damage must be assessed if it has potential for damage or potential for significant damage. The definitions of potential damage and potential significant damage in § 763.83 include circumstances under which there is a “ reasonable likelihood that the material or its covering (emphasis added)" will

become damaged or significantly damaged. The term "covering" applies to thermal system insulation. Thus, thermal system insulation can be characterized as having potential for damage or potential for significant damage.

In addition, § 763.90(a) states that the LEA " shall select and implement in a timely manner the appropriate response actions in this section consistent with the assessment conducted in § 763.88 (emphasis added)." Therefore, the areas requiring response actions under § 763.90 must be assessed under § 763.88. Section 763.90(e) states that "... if any friable surfacing ACM, thermal system insulation ACM, or friable miscellaneous ACM that has potential for damage is present in a building, the local education agency shall at least implement an operations and maintenance program (emphasis added)." Similarly, thermal system insulation ACM with the potential for significant damage also has response action requirements. Since both § 763.90(e) and (f) list response actions for thermal system insulation with the potential for damage and significant damage, such material must be assessed under § 763.88.

Question 32: Can unaccredited persons under the supervision of an accredited inspector collect samples, and look in crawlspaces and other areas to locate ACBM?

Answer: No. Sections 763.85, 763.86, and 763.88 all specifically require an accredited inspector to conduct the necessary tasks in order to fulfill the inspection and reinspection requirements.

Question 33: Must encapsulated ACBM be reassessed every 3 years?

Answer: During a reinspection, in addition to checking friability, encapsulated ACBM must be closely examined to determine whether the response action has failed. If the response action has failed, the area must be reassessed.

Question 34: A school building includes a "covered exterior hallway or walkway". Does this include both the underside and roof of these areas?

Answer: Only the underside of the hallway or walkway is included.

Question 35: By what date must the reinspection be finished? Is it October 12, 1991, July 9, 1992, or 3 years from the original inspection?

Answer: Section 763.85(b)(1) states that "At least once every 3 years after a management plan is in effect, each local education agency shall conduct a reinspection ..."of each school building. If a management plan became effective on July 9, 1989**,** a reinspection must occur no later than July 9, 1992

Question 36: Can a building inspector use his/her own lab to analyze the bulk samples taken?

Answer: Yes, if the lab has interim EPA or NBS accreditation.

Question 37: Can an LEA just assume that some or all friable and nonfriable suspect material contains ACM rather than taking samples?

Answer: Yes, Sections 763.86(a), (b), (c), and (d) explicitly permit suspect ACBM to be assumed to be ACM.

Question 38: What is “suspect” ACM? Can EPA provide a completed list?

Answer: EPA-approved training courses address what type of materials might contain asbestos. In addition, these courses provide guidance on where thee materials are typically located in buildings.

A complete list of all suspected ACBM would b difficult to compile. However, the following is a partial list of materials that are classified as either suspected ACBM for purposes of the rule, or as materials not covered by the rule. Within the latter category, some materials may contain asbestos, but they are not building materials under the rule and therefore are not included in the AHERA rule. Other materials would not contain any asbestos, or enough asbestos to be defined as ACM under the rule.

Material	Suspected ACBM	Not Covered By AHERA Rule
Concrete		x
Cinder block		x
Surfacing materials (e.g., spray applied on trawled-on materials on walls and ceilings)	x	
Blackboards		x
Wall board (material could be gypsum, transit, or other product)	x	
Pressed wood		x
Thermal system insulation	x	
Corrugated-like paper product used for thermal system insulation	x	
Wall or ceiling carpet		x
Gaskets in heating and air conditioning equipment	x	
Floor tile (includes adhesives)	x	
Ceiling tile and panels	x	
Exterior roofing shingles		x, could contain asbestos
Auditorium curtains		x, could contain asbestos
Cement asbestos water pipe	x	
Chemical lab table and desk tops		x, could contain asbestos

Material	Suspected ACBM	Not Covered by AHERA RULE
Fire doors	x	
Fire brick for boilers	x	
Suspected ACBM stored in school		x, could contain asbestos
ACBM cloth adjoining air ducts	x	
Chemical lab gloves		x, could contain asbestos
Fire blanket		x, could contain asbestos
Glass		x
Steel		x
Sheeting in fume hood	x	
Brake shoes		x, could contain asbestos
Kiln bricks and cement		x
Bunsen burner pad		x, could contain asbestos

Question 39:	Please define what is meant by the phrase, "any change in condition", as it refers to surveillance?
Answer:	A maintenance person conducting periodic surveillance would notice water damage, major delamination, a major fiber release, or even minor damage. For surfacing material, damage might also include separation of ACM from the substrate; flaking, blistering, or crumbling of the ACM surface; and scrapes, gouges,, mars, or other signs of physical injury. Asbestos debris may also indicate damage. For thermal system insulation, damage may include gouges, punctures, water damage, crushed areas and torn or missing coverings. The person conducting periodic surveillance will have to be aware of the materials previous condition, documented in the management plan, in order to determine if any changes in the material's condition has occurred.
Question 40:	Should the management planner exercise a quality control function over the inspector's report?
Answer:	Section 763.88(d) requires the accredited management planner "to review the results" of inspections, assessments, and reinspections.

V. EXCLUSIONS

Question 41: Can an inspector who received accreditation in 1988 grant an inspection exclusion for all or part of a school he inspected in 1985?

Answer: Yes. The accredited inspector would essentially state that all or part of his previous inspection has met the requirements of the new Rule (see § 763.99). In general, the accredited inspector is the person Who can determine that the LEA is eligible for an exclusion (see? Sections 763.99(a)(1), (2), (3), (5), (6), and (7). However, under § 763.99(a)(7), an architect or engineer can sign a statement that no ACBM was specified for use in the construction of a school built After October 12, 1988.

Under § 763.99 (a)(4), the lead agency in a State that has Received a waiver from V 763.859a) can grant an exclusion.

VI. RESPONSE ACTIONS

Question 42: Is the removal of nonfriable asbestos containing Floor tile considered a response action that requires the use of accredited personnel? If more than 3,000 square feet is removed this summer, must TEM be used for clearance?

Answer: If the floor tile or its adhesive material does not become friable during the removal process, it is not a response action, since the definition of response action refers to a method "that protects human health and the environment from friable ACBM." If the material becomes friable during removal, however, the job is then a response action requiring both accredited personnel and the use of TEM if the area exceeds 3,000 square feet.

Typically, vinyl asbestos floor tile is tightly bound and asbestos is generally not released under normal use. However, during a removal operation, the tile could be rendered friable. In addition, any sanding operations conducted to remove the adhesive beneath the tiles would render the adhesive material friable.

Question 43: Is the installation of carpet over damaged A/V Floor tiles an enclosure?

Answer: No. An enclosure is defined in § 763.83 as "an airtight, impermeable, permanent barrier around ACBM to prevent the release of asbestos fibers into the air." Carpeting is not impermeable, permanent, or airtight.

Question 44: What does the term "timely fashion" mean? How will EPA enforces this?

Answer: On page 41839 of the preamble EPA addresses the "timely fashion" issue:

> However, LEAs should be advised that in providing a schedule for beginning and completing each response action as required in § 763.93(e)(6), the LEA is specifying what constitutes implementation of preventive measures and response actions in a timely fashion for that LEA (emphasis added). EPA and State enforcement officials will be monitoring LEA adherence to these schedules to determine whether enforcement actions are warranted against those schools which fail to meet their own deadlines for completing preventive measures and response actions. In reviewing management plans, States may reject plans if the schedule for response actions is not reasonable and timely (AHERA § 205(c)(1)).

Question 45: If, during a periodic surveillance check, a custodian finds damaged thermal system insulation, what must be done?

Answer: Section 763.90(b) states that "... if damaged or significantly damaged thermal system insulation ACM is present in a building, the local education agency shall:

1) At least repair the damaged area.
2) Remove the damaged material if it is not feasible, due to technological factors, to repair the damage.
3) Maintain all thermal system insulation ACM and its covering in an intact state and undamaged condition."

As a result, the LEA must at least repair the damaged area and make sure that the thermal system insulation is constantly maintained in an intact state and undamaged condition.

Question 46: Is ceiling tile friable or nonfriable? If it is friable, must accredited persons and TEM be used to remove 3,600 square feet of ceiling tile in a cafeteria?

Answer: Like all other materials, the friability of ceiling tile must be determined by hand pressure. If the ceiling tile is friable, and the inspector either assumes ceiling tile is ACM or sampling confirms the presence of ACM, accredited persons and TEM must be used in the example outlined above.

VII. OPERATIONS & MAINTENANCE (O&M)

Question 47: Please define the phrase, "... materials that are about to become friable…"

Answer: If a workman is about to sand nonfriable floor tile that was assumed to be ACBM, this material would shortly become friable. The material would immediately be subject to the O&M requirements found in §763.91.

Question 48: Are there circumstances under which initial cleaning requires the use of an accredited supervisor?

Answer: No. Section 763.91(c)(1) does not require accredited personnel for this task.

Question 49: Must an accredited person develop the O&M plan?

Answer: No. AHERA stipulates that only certain activities require an accredited person. Section 206(a)(3) does not require an accredited person to develop the O&M plan. However, EPA strongly recommends that schools use an accredited management planner to develop the O&M plan to ensure that the plan is consistent with the regulations.

Question 50: O&M covers friable material only. What about nonfriable ACBM with the potential for damage? Does this type of material need to be addressed in an O&M plan?

Answer: Nonfriable surfacing and miscellaneous materials need not be covered by an O&M plan, even if they have potential for damage or significant damage.

However, as stated in § 763.90(e) and (f), thermal system insulation with the potential for damage or significant damage must be covered in an O&M program as described in § 763.91.

Question 51: What is the difference between § 763.91, which addresses operations and maintenance activities, and the O&M plan required in § 763.93?

Answer: The operations and maintenance requirements listed in S 763.91 are in effect for all LEAs whenever specific maintenance activities are conducted or accidents occur. The O&M plan as part of the management plan is a particular control program tailored to each individual school. Section 763.91 describes the procedures which LEAs must carry out for certain O&M activities, such as cleaning, in their buildings after December 14, 1987. An O&M plan in § 763.93 is a specific control program for a particular school building. For example, the O&M plan for a certain school may include a monthly schedule for routine cleaning, and may also include specific requirements of how to prevent fiber release from ACBM within the school building. (The procedures for such a plan are provided in § 763.91.) The O&M plan for a particular school may also include a permit system to exercise control over work conducted in the school that could disturb ACBM. The O&M plan must be implemented as part of the school's management plan no later than July 9, 1989.

VIII. CUSTODIAL AND MAINTENANCE WORKER TRAINING

Question 52: a) Will any of the custodial and maintenance worker personnel who have received previous training be "grandfathered" in?

b) If so, what criteria will these workers have to meet, and what will be the process for making the determination?

Answer: a) Custodial and maintenance personnel may be “grandfathered". Section 763.92(a)(3) states that “...local education agency maintenance and custodial staff who have attended EPA-approved asbestos training or who received equivalent training for O&M and periodic surveillance activities involving asbestos shall be considered trained for purposes of this section."

b)In making this determination, LEAs will need to determine if previous training adequately covered the topics required in §§ 763.92(a)(1) and (2). Equivalent training in this case means comparable training; it need not be exactly the same. Obviously a training course taken in 1985 could not have covered the AHERA statute or regulation, or the OSHA standard. Previous instruction, however, must have covered the following key items: information on health effects; how to recognize ACBM and damaged ACBM; and, for staff who may disturb ACBM, information on handling ACBM, use of respirators and hands-on training. Additionally, EPA recommends that individuals who have received equivalent training in the past receive information on AHERA.

Question 53:	What are the qualifications or exact training needed by an individual who conducts the 2-hour awareness training and the 14-hour additional training for the maintenance and/or custodial employees?
Answer:	The regulation does not require specific qualifications for instructors who perform O&M training. LEAs should, however, select instructors with a professional or educational background in the asbestos field.
Question 54:	Does EPA plan to develop a "canned" training program for the 2-hour training course required for custodial and maintenance workers under § 763.92?
Answer:	With EPA funding, the National Asbestos Council and the American Association of School Administrators (AASA) have worked jointly to develop a videotape and instructor's manual that generally cover the requirements for the 2-hour awareness training for custodial and maintenance staff. One of EPA's funded training centers, Temple University, is also developing an awareness video. As required by the rule, custodial and maintenance staff must also receive site-specific training (e.g., location of ACBM in their building). LEAs interested in the AASA videotape should contact AASA at (703) 875-0723 for details.

Question 55**:**	Sections 763.92(a)(1) and (2) refer to 2-hour training and 14-hour training. If an LEA's workers have not taken the 3-day course to become "accredited" abatement workers, and the LEA decides to have workers receive the 2-hour and 14-hour training, where should the workers go for the abbreviated training? How is this training documented?
Answer:	EPA anticipates that LEAs will use a variety of resources to train custodial staff. Private consultants, LEA staff, local colleges and labor groups are potential sources of instructors for O&M training. Section 763.94(c) requires LEAs to keep specific information on O&M training, including the location of the training and the number of hours of training.

IX. MANAGEMENT PLANS

Question 56: Under what circumstances can a State disapprove a management plan? Is an LEA required to accept changes recommended by the State?

Answer: Section 205(c)(1) of AHERA states

> … the Governor may disapprove a management plan within 90 days after the date of receipt of the plan if the plan:
> (A) does not conform with the regulations under § 203 (i) (or with § 204(d) if there are no regulations),
> (B) does not assure that contractors who are accredited pursuant to this title will be used to carry out the plan, or
> (C) does not contain a response action schedule which is reasonable and timely, taking into account circumstances relevant to the speed at which the friable ACM in the school buildings under the local education agency authority should be responded to, including human exposure to the asbestos while the friable ACM remains in the school building, and the ability of the local education agency to continue to provide educational services to the community.

According to § 205(c)(2) of AHERA, "if the State Governor disapproves a plan, the State Governor shall explain in writing to the LEA the reasons why

the plan was disapproved and the changes that need to be made in the plan. Within 30 days after the date on which notice is received of disapproval of its plan, the LEA shall revise the plan to conform with the State Governor's suggested changes (emphasis added). The Governor may extend the 30 day period for not more than 90 days."

The LEA, therefore, must revise its plan to conform with changes specified by the State in conformance with § 205(c)(1). If the LEA's plan does not conform with the State's modified plan, the school is in violation of AHERA.

Question 57: An LEA has to develop an asbestos management plan for each school. Does this mean an LEA has to have a separate management plan for each of its schools, or can it have one large plan that covers all of its schools?

Answer: LEAs must have a separate management plan for each school, according to § 763.93(a)(1). In addition, § 763.93(g)(3) states, "Each school (emphasis added) shall maintain in its administrative office a complete, updated copy of the management plan for that school." To clarify further, this does not mean that each building on a school's campus needs the management plan, just the administrative office for that school.

Question 58: After October 12, 1988, under what circumstances will LEAs have to submit a revised management plan to the State for review?

Answer: Sections 763.93(a)(2) and (3) require LEAs to submit management plans to their States for school buildings leased, otherwise acquired, or used as school buildings after October 12, 1988. This requirement is for buildings added to the plan.

Question 59: Must LEAs notify their State when they update their management plans after a reinspection?

Answer: No. The rule does not require LEAs to notify their State when they update the management plan as a result of a reinspection. This pertains to buildings already in the management plan. However, through their own regulations, States may require LEAs to notify the appropriate State agency when plans are updated as a result of a reinspection.

Question 60: When must the LEA initially notify parent, teacher, and employee groups in writing about the availability of the management plan?

Answer: Section 763.93(g)(4) requires LEAs to notify in writing parent, teacher, and employee organizations of the availability of the management plan when the management plan is submitted to the Governor (State designee) and at least once each school year.

Question 61**:** If the LEAs have been inspected by an accredited inspector, samples have been taken and analyzed, and no asbestos-containing material has been found, must the district still develop a management plan? At what point is it not necessary to develop a plan?

Answer: The answer to the first part of this question is yes. Section 763.93(e) requires the results of the inspection to be reported in the management plan. With respect to the second part of the question, all LEAS, even a school built after October 12, 1988, with an exclusion based on an architect's statement that no ACBM was used in construction (see § 763.99(a)(7)), must have a management plan. In this case, the management plan would simply include the architect's statement and the notification to parents, teachers, and employees regarding the availability of the plan.

Question 62: If, in 5 years, an LEA has all ACM removed from a school building, does the annual written notification requirement regarding the management plan availability and asbestos-related activities still apply?

Answer: The annual written notification to parents, teachers, and other school employees remains in effect even if a school indicates it has removed all ACM. The purpose of the availability of the management plan is to enable the public to determine if the LEA has implemented the management plan satisfactorily.

Question 63:	Are the LEAs required to keep and/or maintain their management plan for any specified length of time?
Answer:	The rule does not specify a date after which LEAs no longer need a management plan. As a result, LEAs should plan to keep their management plans indefinitely. Certain records, however, can be discarded within a certain period of time after the ACBM has been removed (see § 763.94).
Question 64:	Section 763.93(f) states that the LEA "may" require a statement signed by an accredited management planner that the plan is in compliance with the Rule, but that this statement may not be signed by the person responsible for implementing the plan (even though he/she may be an accredited management planner). Why is the plan implementor prohibited from signing this statement?
Answer:	Section 763.93(f) comes directly from the statute § 203(i)). However, as noted in the actual language, such a statement is not required. The purpose of this prohibition is to discourage conflict of interest between the management plan preparer and an abatement contractor. For LEAs with a concern about conflict of interest between the management planner and the abatement contractor, or about the adequacy of the plan, such a statement should be considered.

Question 65: What forms of written public notifications are acceptable? If no specific organizations exist for the LEA to address, what constitutes acceptable written notification?

Answer: LEAs have a great deal of flexibility with respect to methods of notifying parents, teachers, and employees. However, § 763.93(g)(4) requires LEAs to keep a copy of the notification. A letter to the PTA and the employees' union is acceptable.

In the absence of such formal organizations, the LEA must still notify parents, teachers, and employees in writing. As stated on page 41841 of the rule's preamble, in some instances this notification could take the form of a newspaper advertisement, an article in an LEA newsletter, or some other form. The Agency will further examine these methods of notification on a case-by-case basis. LEAs unsure about how to properly notify these groups should contact their Regional Asbestos Coordinator.

Please note, under S 763-93(g)(4), LEAs must include in the management plan a description of the steps taken to notify such organizations, and maintain a dated copy of the notification.

X. RECORDKEEPING

Question 66: How should the periodic surveillance results be documented? How detailed does the information have to be and what constitutes adequate records?

Answer: Section 763.94(d) requires LEAs to "... record the name of each person performing periodic surveillance, the date of the surveillance, and any changes in the conditions of the materials." A one-page checklist (i.e., change/no change) with sufficient room for comments by the person conducting the surveillance would be adequate. if changes are noticed, the comments must describe each change clearly.

XI. ACCREDITATION

Question 67: Does a person have to take the training course and exam from the same sponsor for accreditation?

Answer: AHERA sections 206(b)(1) and (c)(1) indicate that persons seeking accreditation need to take a training course and pass an examination. For full accreditation through an EPA-approved course, persons must take the course and exam from the same training course sponsor. States that have accreditation programs may require persons seeking accreditation to pass a State-administered exam. Section 206(c)(1) of AHERA states that "... the Administrator shall ensure that any EPA-approved training course is consistent with the model plan (including testing requirements) developed under subsection (b). A contractor may be accredited by taking and passing such a course."

Question 68: If an individual took a course at an EPA training center after January 1, 1985, and was "grandfathered in" as having taken an approved course, when does this person have to take a course to become fully accredited? When is the first refresher course required?

Answer: Persons who are "grandfathered in" after January 1, 1985, do not have to take a course to become fully accredited until one year after their State has or was required to have an accreditation plan approved by EPA, and do not have to take the first refresher

course until 2 years after their State has or was required to have an accreditation plan approved by EPA. For example, a State legislature convenes in January 1988. By July 1988, the State must have developed an accreditation program that meets the Model Plan. Contractors, inspectors, management planners, workers, supervisors and abatement project designers in that State have one year to become fully accredited (i.e., July 1989). The first refresher training would be required by July 1990. These dates are still in effect for individuals even if the State fails to act, in which event, they would complete EPA-approved courses at the specified intervals.

Question 69: What is the time frame for accredited individuals to take the required refresher training course? For example, are they required to take the refresher course prior to the expiration of their accreditation, or 60 days after? If they do not take the refresher course prior to expiration or some subsequent date including a grace period, will they be required to take another full training course and pass the required examination before they can be reaccredited?

Answer: Individuals must take an annual refresher course to maintain their accreditation, as specified in the answer to Question 68. In the

example cited above, if a person fails to take the refresher course within the 1-year prescribed period, their accreditation ceases. As a result, those persons cannot conduct AHERA work in their pertinent discipline. They will have 12 more months to take the refresher course in order to resume conducting AHERA work. If a refresher course is not taken during that period (i.e., within 24 months after accreditation), the entire training course (e.g., 4 days for supervisors) must be repeated and the exam passed.

Question 70: When would a conflict of interest exist among accredited personnel?

Answer: A conflict of interest with respect to accredited personnel would exist if, for example, the management planner and abatement contractor worked for the same firm. The planner might recommend to the LEA more expensive response actions than are necessary in the management plan.

Question 71: May a person serve as an accredited inspector and management planner on the same school project?

Answer: Yes. EPA anticipates that many LEAs will have the same person conduct both tasks. However, LEAs must still evaluate whether that person has a conflict of interest (see section 763.84(h)).

Question 72: Can an LEA hire one abatement firm both to conduct a response action and to carry out the TEM clearance air monitoring on that project?

Answer: No. In Appendix A on page 41858 of the rule under "Sampling", it states that TEM "... sampling operations must be performed by qualified individuals completely independent of the abatement contractor to avoid possible conflict of interest." The LEA would have to select another person or firm "completely independent" of the abatement contractor to do this work. The abatement firm would not be allowed to subcontract this work since the subcontractor is not "completely independent" of the contractor.

Question 73: Can an LEA itself become approved as a training center?

Answer: Yes.

Question 74: How can an LEA find accredited personnel to perform inspections, develop management plans, and conduct response actions?

Answer: In States with EPA-approved programs, the LEA should contact the appropriate State agency responsible for accreditation. In States without approved programs, LEAs may communicate with the contacts from EPA-approved courses and request a list of accredited individuals. LEAs also have the option of hiring

accredited personnel from a State with an EPA-approved program. of course, LEAs may also choose to solicit proposals to conduct inspections, management plans and response actions in newspapers, professional or trade journals. The requirement that persons must be accredited should be emphasized in the LEA's description of the project. Two national organizations, the National Asbestos Council and the National Insulation Contractors Association, have or are in the process of developing lists of their members who have accreditation credentials. Finally, LEAs may have their own personnel trained and accredited through EPA-approved courses or State programs.

Question 75: Must an individual respirator fit test be given to each and every training course participant? Many training providers are concerned about their liability. Shouldn't the student be required to furnish a doctor's statement that indicates the student can safely wear a respirator?

Answer: Training entities must provide students with the opportunity for respirator fit testing. If a student declines to be fit-tested, that is his or her prerogative. In addition, a training entity may require the student to furnish medical evidence that he or she is capable of wearing a respirator. Therefore, if a student has a medical statement from a physician indicating that he or she can be fit-tested, and the student wants to be fit-tested, the training entity must fit-test the student.

Question 76:	Must an accredited designer be used to design a response action?
Answer:	Section 763.90(g) requires that "Response actions including removal, encapsulation, enclosure or repair, other than small-scale, short-duration repairs, shall be designed and conducted by persons accredited to design and conduct response actions (emphasis added)." An accredited designer, then, must develop the job specifications for a response action.
Question 77:	If an abatement designer takes the course for contractors and supervisors, and his/her certificate says "contractor/supervisor", how can the individual prove that he/she is qualified to design abatement projects?
Answer:	The designer should show the LEA the relevant section of the Model Accreditation Plan that enables a person who has successfully completed the contractor/supervisor course to be accredited as a designer (see plan page 15878, "Abatement Project Designers").

Question 78:	Where does it say in the AHERA rule that LEAs must use accredited workers and supervisors to conduct asbestos abatement work after December 14, 1987?
Answer:	Section 763.90(g) requires response actions to be designed and conducted by persons accredited to design and conduct response actions. on page 41826, under the heading "Dates", it states that ... rule shall be effective on December 14, 1987 the "... rule shall be effective on December 14**,** 1987." As a result, the requirement to use accredited personnel under AHERA is in effect as of December 14, 1987. Any asbestos-related work requiring accreditation conducted after that date or must use accredited persons.

XII. TEM, PCM, SAMPLING AND ANALYSIS

Question 79: With respect to TEM, what does the term "contiguous portions" mean?

Answer: The intent of S 763.90(i)(8) is to prevent an LEA from artificially dividing up a large project so as to avoid the TEM requirement. For example, an LEA that has a 3,300 square foot gymnasium cannot artificially divide the gym into 3 separate areas of 1,100 square feet, and then conduct separate abatement in each area, clearing each area by PCM. These areas are obviously contiguous, thus TEM is required.

However, an abatement job in wing A of a building that totals 1,700 square feet and a job in a separate, non-contiguous wing that totals 1,500 square feet are not contiguous portions of material.

Question 80: If an LEA plans to remove 3,500 square feet of ACBM from six adjacent classrooms joined by a hallway, does TEM have to be used for clearance of the entire area or can the LEA choose to remove the ACBM from each classroom separately and use PCM to clear each separate room?

Answer: TEM must be used unless clear engineering reasons exist for dividing such a project into smaller areas. A primary reason EPA permitted the use of PCM for the 3-year phase-in period was to enable an LEA to minimize its total abatement expenses for a small project (e.g., less than 3,000 square feet). For one small project, EPA believes the additional cost of TEM analysis at current prices could greatly increase the total cost of the project.

However, permitting an LEA to subdivide what would normally be one large project into several smaller projects defeats the purpose of the TEM requirement. As necessary, EPA will review such situations on a case-by-case basis.

Question 81: What is meant by the phase "at approximately the same time" (in § 763.90(i)(8)) as it relates to TEM clearance?

Answer: The intent of §763.90(i)(8) is to prevent an LEA from avoiding the TEM requirement by either artificially dividing up a larger project, or by removing ACBM in stages over the course of a relatively short period of time from what normally would have been one large Project if the TEM phase in did not exist. For example, if an LEA removed 1,600 square feet of surfacing ACBM in June 1988, and 1,600 square feet of adjacent surfacing ACBM a few weeks later, EPA would consider this to be removing contiguous portions of ACBM at approximately the same time". As necessary, EPA will review such situations on a case-by-case basis.

Question 82: Would surfacing ACBM on ceilings of two classrooms on two separate floors be viewed as contiguous areas?

Answer: No. Even if one classroom was directly beneath the other-classroom, these would not be contiguous areas under the rule. Each floor would normally have its own containment barrier.

Question 83: With regard to TEM, is there a plan to establish a certain number of air samples to be collected for abatement project clearance based on square footage/area or cubic footage/ volume?

Answer: No. As stated in Appendix A, the minimum number of TEM samples that need to be collected for each test site is 13 samples. These break down as follows:

— 5 samples per abatement area

— 5 samples per ambient area positioned at locations representative of the air entering the abatement site

— two field blanks

— one sealed blank

Not all of these samples will have to be analyzed, in certain cases.

Question 84: Are there criteria for doing aggressive air monitoring?

Answer: Yes. Unit III.B.7.d. of Appendix A in the rule provides criteria for aggressive air monitoring.

Question 85:	Please define the term "nonfriable suspected ACBM." Also, what does the term "manner sufficient to determine" mean with respect to sampling such material?
Answer:	Nonfriable suspected ACBM could be wallboard or floor tile. "Manner sufficient to determine" means the accredited inspector must take an appropriate number of samples for that material. For example, a number of training courses recommend that an inspector take the same number of samples for materials like floor and ceiling tiles as the inspector would for surfacing material. Other training courses suggest that three samples should be taken from homogeneous areas of such material.
Question 86:	Please clarify the use of the term, "homogeneous area", which has a regulatory definition of being uniform in color or texture, when applied to thermal system insulation having pipe lagging that has either been discolored or applied differently to give the appearance of possessing a different texture.
Answer:	The accredited inspector must make a judgment on whether pipe lagging is indeed uniform in color and texture. If the suspect material looks darker due to water damage, it is appropriate for the inspector to consider this as part of the same homogeneous area. If the suspect material has been applied differently, however, it probably would not be uniform in color and texture since there would be a noticeable difference in the suspect materials appearance.

Question 87: If PCM is being used for clearance, does the sampling volume table in the mandatory TEM method have to be followed to determine the sampling volume for the PCM samples?

Answer: No. The table is required only for samples which will be analyzed by TEM. The table was set up to maintain an analytical sensitivity of 0.005 fibers per cubic centimeter (f/cm3) for the TEM analysis. The table does not apply to the PCM analysis.

Question 88: How does one determine the amount of air to sample for the PCM analysis to maintain a limit of quantification of 0.01 f/cm^3?

Answer: Follow the procedure in the EPA Silver Book, specifically outlined on pages 4-5. The volume required to reliably quantify fibers down to 0.01 f/cm^3 may be calculated using the first formula on these pages. Note that for NIOSH 7400, the minimum fiber loading is specified. Also, alert labs that the area of viewing for a field will vary between microscopes and that they must determine this value from their microscopes.

Question 89:	Can dual-headed pumps be used at abatement sites when taking the five samples?
Answer:	This avoids the intent of the directions given in the nonmandatory appendix for TEM. The method states: "Position ambient samples at locations representative of the air entering the abatement site." A dual-headed pump will not sample air at two different locations.
Question 90:	Can someone collect more than five samples inside the abatement site and pick the best of the results for the clearance test?
Answer:	No. An equal number of samples should be taken inside and outside the abatement site for clearance. The minimum number is five inside and five outside. The rule does not prohibit the collection of more than five samples inside and an equal number outside; however, collection of a higher number inside and then selecting only five of those values is not appropriate.
Question 91:	How can the public get copies of the listing of accredited laboratories?
Answer:	Contact a Regional Asbestos Coordinator or call the TSCA Hotline at (202) 554-1404.

XIII. WARNING LABELS

Question 92: Do you have to label enclosed or encapsulated ACBM in routine maintenance areas?

Answer: Yes. Section 763.95(a) states that "... the local education agency shall attach a warning label immediately adjacent to any friable and nonfriable ACBM and suspected ACBM assumed to be ACM located in routine maintenance areas (such as boiler rooms) at each school building. This shall include:

1) Friable ACBM that was responded to by a means other than removal.

2) ACBM for which no response action was carried out."

Question 93: What are some examples of routine maintenance areas that would require labeling? What does routine mean?

Answer: Examples are boiler rooms, equipment rooms, pipe tunnels, fan rooms, air handling rooms, or any other area that serves primarily as a maintenance area.

"Routine" means that a maintenance or custodial person frequents an area (see above) on a regularly scheduled or predictable basis to perform maintenance activities.

Question 94: In general, will school employees other than custodial and maintenance workers have to stay out of routine maintenance areas?

Answer: The rule does not prohibit other school employees from entering routine maintenance areas.

XIV. TRANSPORT AND DISPOSAL

Question 95: In Appendix D of the rule, dealing with the transport and disposal of asbestos waste, should the "shoulds" be interpreted as "shalls"? In other words, are these recommendations now requirements?

Answer: The recommendations in the transport and disposal guidance document-have not become requirements. LEAs have to comply with applicable DOT and NESHAP regulations governing transport and disposal, not with the recommendations found in Appendix D. Enforcement of Appendix D will be based on the current DOT and NESHAP regulations cited in the Appendix, not on the recommendations suggested therein.

XV. STATE WAIVERS

Question 96: Can EPA delegate the AHERA regulatory program to government agencies such as county and city governments? Several county and city governments have programs which are more stringent.

Answer: With respect to § 763.98 which addresses State waivers, these waivers apply only to States.

XVI. MISCELLANEOUS

Question 97: Who will review the management plans submitted by the Department of Defense (DOD)?

Answer: Section 203 (1) of AHERA requires the Secretary of Defense to carry out " any function, duty, or other responsibility imposed on a Governor of a State [for 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.)."

Question 98: Does the regulation explicitly prohibit any conflict of interest?

Answer: Yes. In Appendix A to the rule, the regulation states that TEM "…sampling operations must be performed by qualified individuals completely independent of the abatement contractor..."

Question 99: What are EPA's plans for developing standardized or model forms for inspections and/or management plans?

Answer: The EPA-funded model training course materials for trainers, available for purchase by calling 301/468-1916, and the LEA Guide to assist LEAs in complying with the new rule, mailed to LEAs in February, include model forms and formats for inspections and management plans, respectively.

Question 100: In a high school vocational-tech class dealing with automobile brake repairs, or in a school maintenance facility that repairs brakes on school buses, is the asbestos hazard from brake dust covered by AHERA?

Answer: No. AHERA covers asbestos-containing building materials only, and brake shoes are not building materials under AHERA. However, EPA believes it is advisable to establish a program to contain brake dust and prevent its release (see also OSHA's Appendix F to its rule). EPA has proposed a rule to phase out the use of asbestos in brakes and other products. Information on establishing a program to control brake dust can be found in the publication, Guidance for Preventing Asbestos Disease Among Auto Mechanics.

This publication is available from:

Superintendent of Documents

U.S. Government Printing Office

Washington, DC 20402

TN930
.A823
1988

000R88103

ASBESTOS-IN-SCHOOLS: A GUIDE TO NEW FEDERAL REQUIREMENTS FOR LOCAL EDUCATION AGENCIES



Office of Toxic Substances
Office of Pesticides and Toxic Substances
U.S. Environmental Protection Agency
Washington, D.C. 20460
February 1988

TABLE OF CONTENTS

	Page
Introduction	i
CHAPTER 1 - MAJOR ELEMENTS OF THE NEW RULE	1
CHAPTER 2 - APPOINT A DESIGNATED PERSON	3
CHAPTER 3 - USE ACCREDITED PERSONS	5
CHAPTER 4 - CONDUCT INITIAL INSPECTIONS	7
CHAPTER 5 - DEVELOP A MANAGEMENT PLAN	13
CHAPTER 6 - IMPLEMENT APPROPRIATE RESPONSE ACTIONS	19
CHAPTER 7 - CONDUCT PERIODIC SURVEILLANCE AND REINSPECTIONS	23
CHAPTER 8 - ASSURE PROPER TRAINING AND AWARENESS	24
CHAPTER 9 - MAINTAIN RECORDS	26
CHAPTER 10 - COMPLY WITH THE NEW RULE	29
APPENDIX A - EPA-Funded Training Programs	31
APPENDIX B - Regional Asbestos Coordinators	32
APPENDIX C - AHERA State Designated Contacts	33
APPENDIX D - Sample Form	41

U.S. Environmental Protection Agency
Region 5, Library (5PL-16)
230 S. Dearborn Street, Room 1670
Chicago, IL 60604

INTRODUCTION

INTRODUCTION TO AHERA

On October 22, 1986, President Reagan signed into law the Asbestos Hazard Emergency Response Act (AHERA, Public Law 99-519). The law required EPA to develop regulations which provide a comprehensive framework for addressing asbestos problems in public and private elementary and secondary schools. On October 30, 1987, EPA published the Asbestos-Containing Materials in Schools Rule [40 CFR Part 763 Subpart E]. This New Rule requires all public and private elementary and secondary schools to inspect for friable and non-friable asbestos, develop asbestos management plans that address asbestos hazards in school buildings, and implement response actions in a timely fashion. References to the New Rule are provided throughout this Guide in brackets (e.g., [Section 763.85] and always refer to a section of Title 40 of the Code of Federal Regulations (40 CFR)).

To carry out the above activities, involving inspections, management plans, and response actions, schools must use accredited persons. On April 30, 1987, EPA published the Model Accreditation Plan [40 CFR Part 763 Appendix C to Subpart E] required by AHERA, which specifies training, examination, and other requirements for persons who inspect, develop management plans, and design or conduct response actions in schools. The Model Plan became effective on June 1, 1987.

PURPOSE OF THIS GUIDE

This Guide provides practical information to help Local Education Agencies (LEAs) meet the requirements of the new Asbestos-Containing Materials in Schools Rule. In 1982, EPA published an asbestos-in-schools rule that required the identification of friable asbestos-containing materials in schools. The 1982 Asbestos-in-Schools rule also included notification requirements.

The new 1987 Asbestos-Containing Materials in Schools rule, written under the authority of AHERA, took effect on December 14, 1987. Compared to the 1982 rule, the New Rule's requirements are much more comprehensive in scope. LEAs that met the requirements of EPA's 1982 rule will have to accomplish a variety of new tasks mandated by Congress to comply with EPA's 1987 Asbestos-Containing Materials in Schools rule. This Guide will assist LEAs in meeting these new requirements. Most chapters include checklists that are designed to help LEAs comply with the New Rule.

KEY DATES AND PROVISIONS

LEAs should be aware of the dates when key provisions in the New Rule take effect. The New Rule has three key dates:

- **As of December 14, 1987, LEAs must:**

  ☐ Use accredited personnel to design and carry out response actions other than operations and maintenance,

- ☐ Have custodial and maintenance staff members receive training prior to conducting activities that may disturb asbestos,
- ☐ Post warning labels in routine maintenance areas where asbestos was previously identified,
- ☐ Abide by the operations and maintenance requirements whenever these activities need to be performed,
- ☐ Comply with response action clearance requirements of the New Rule,
- ☐ Transport and dispose of asbestos waste as required by the New Rule, and
- ☐ Maintain the records necessary to verify compliance with each of the above requirements.

- **By October 12, 1988, LEAs must:**
  - ☐ Complete an initial inspection to locate all asbestos-containing building materials (ACBM), and
  - ☐ Develop and submit to the State an asbestos management plan that includes the results of the inspection.

- **No later than July 9, 1989, LEAs must:**
  - ☐ Begin to implement their management plan.

Each LEA must also select and train an LEA Designated Person as soon as possible. This person is responsible for ensuring that a variety of activities -- including the initial inspection, operations and maintenance activities, and other response actions -- are properly conducted. If an LEA has not done so already, designating and training such a person is the first step to take to comply with the New Rule.

CHAPTER 1 - MAJOR ELEMENTS OF THE NEW RULE

The New Rule includes a variety of requirements that an LEA must meet. This Guide will assist LEAs in understanding the New Rule; each LEA, however, must closely review the regulatory language in the New Rule to fully understand its requirements.

Throughout this Guide, the term LEA is used to refer to the administrative body that directs any public or private non-profit elementary or secondary school. For example, an LEA would include an entire city or county public school system consisting of multiple elementary and secondary schools, as well as one private, non-profit elementary school (e.g., a private school administered by a religious group). The New Rule applies to all LEAs, regardless of size. The definition of LEA in the New Rule should be consulted if any uncertainty exists about a school's status [Section 763.83].

This chapter provides LEAs with an overview of the major requirements of the New Rule. Exhibit 1-1 summarizes the key areas that LEAs must understand in order to meet the New Rule's requirements. The chapters that follow describe in greater detail the New Rule's major requirements and the steps LEAs must take to comply. Sections of the New Rule are referenced throughout the Guide to assist LEAs.

EXHIBIT 1-1

MAJOR REQUIREMENTS FOR LEAs

- **APPOINT A DESIGNATED PERSON**..... **Chapter 2**
  LEAs must appoint a designated person and ensure that he/she is adequately trained.

- **USE ACCREDITED PERSONS**..... **Chapter 3**
  LEAs must use properly accredited persons to conduct initial inspections, develop management plans, design and carry out response actions, and conduct reinspections.

- **CONDUCT INITIAL INSPECTIONS**..... **Chapter 4**
  LEAs must use an accredited inspector to conduct inspections and must keep records of all activities.

- **DEVELOP A MANAGEMENT PLAN**..... **Chapter 5**
  LEAs must use an accredited management planner to develop the management plan, submit the plan to the appropriate State agency, and maintain an updated copy of the plan. These plans must be made available to the public.

- **IMPLEMENT APPROPRIATE RESPONSE ACTIONS**..... **Chapter 6**
  LEAs must use an accredited management planner to recommend response actions, and must select an accredited person to design and conduct these response actions.

- **CONDUCT PERIODIC SURVEILLANCE AND REINSPECTION**..... **Chapter 7**
  LEAs must conduct periodic surveillance, use an accredited inspector to conduct reinspections, and keep records of all activities.

- **ASSURE PROPER TRAINING AND AWARENESS**..... **Chapter 8**
  LEAs must provide necessary training to maintenance and custodial staff, provide short-term workers with information about the location of any asbestos-containing building material, and post necessary warning labels.

- **MAINTAIN RECORDS**..... **Chapter 9**
  LEAs must update the management plan as appropriate, retain an updated version of the plan, make all records available upon request, and notify affected parties of the availability of the plan.

- **COMPLY WITH THE NEW RULE**..... **Chapter 10**
  LEAs must follow the requirements according to the time schedule set forth in the New Rule.

CHAPTER 2 - APPOINT A DESIGNATED PERSON

APPOINTING THE LEA'S DESIGNATED PERSON

Each LEA must have a designated person who is trained to oversee asbestos activities and ensure compliance with the New Rule. The LEA's Designated Person must be appointed as soon as possible to oversee the initial inspection and management plan development, implementation of any operations and maintenance activities (including training of custodial and maintenance personnel), preventive measures, posting of warning labels, and any response actions that may be necessary.

The LEA's Designated Person does not have to be an LEA employee. An outside consultant is acceptable. In addition, two or more LEAs may choose to have the same individual serve as the Designated Person for each LEA.

TRAINING OF THE LEA'S DESIGNATED PERSON

It is important for each LEA to make sure that its Designated Person receives the training needed to oversee the completion of all the actions required under the New Rule. This training must provide basic knowledge of: 1) health effects of asbestos exposure; 2) detection, identification, and assessment of ACBM; 3) options for controlling ACBM; 4) asbestos management programs; and 5) relevant Federal and State regulations [Section 763.84(g)]. Eight EPA-funded university training programs provide appropriate training (see Appendix A). The LEA's Designated Person can receive this type of training from one of the EPA centers, or any other training provider, as long as the course covers the required subjects.

DUTIES OF THE LEA'S DESIGNATED PERSON

Among other tasks, the LEA's Designated Person is responsible for ensuring that the LEA follows the correct procedures for inspection, management plan development and submission, implementation of response actions, and recordkeeping. In addition, he or she will provide a single contact for the public to obtain information about asbestos-related activities in the LEA. The Rule requires the LEA's Designated Person to ensure that the following actions are performed properly:

- Inspections, reinspections, and periodic surveillance are conducted (see Chapters 4 and 7); ☐
- Management plans are developed, submitted to the State, and updated (see Chapter 5); ☐
- Workers and building occupants, or their legal guardians, are informed at least once each school year about inspections, response actions, and post-response activities (see Chapters 5); ☐

- Response actions are developed and implemented (including operations and maintenance) (see Chapter 6); ☐
- Custodial and maintenance employees are trained (see Chapter 8); ☐
- Short-term workers (e.g., telephone repair workers, utility workers, or exterminators) who may come in contact with asbestos in a school are given information regarding the locations of ACBM (see Chapter 8); ☐
- Warning labels are posted as needed (see Chapter 8); ☐
- The potential for conflict of interest that may arise between accredited personnel to be hired by the school is considered by the LEA (see Chapter 3); and ☐
- Management plans are available for inspection, and proper notification of management plan availability has been provided (see Chapter 9). ☐

CHAPTER 3 - USE ACCREDITED PERSONS

Persons who are to conduct certain asbestos-related work in schools must be accredited. On April 30, 1987, EPA published its Model Accreditation Plan [40 CFR Part 763 Appendix C to Subpart E], which specifies training, examination and other requirements for persons requiring accreditation. The Model Plan also includes provisions for "grandfathering" persons who have received suitable training since January 1, 1985.

Persons can be accredited by States, which are required to adopt contractor accreditation plans that are at least as stringent as the EPA Model Accreditation Plan, or by completing an EPA-approved training course and passing an examination for this course. LEAs should check with their EPA Regional Asbestos Coordinator (RAC) (see Appendix B) to determine whether their State has an approved State contractor accreditation program that meets the requirements of the Model Plan. States have the authority to develop accreditation programs that are more stringent than the EPA Model Plan; thus, an LEA should check with either the State AHERA designee (see Appendix C) or the Regional Asbestos Coordinator to determine if there are any additional State requirements.

LEAs should realize that accreditation alone does not guarantee the quality of performance. When selecting an accredited person, LEAs should closely examine the qualifications and experience of that person. In addition, before hiring a person to perform a task requiring accreditation, LEAs should check with the EPA-approved State program or training course to verify accreditation credentials.

The following activities require the use of accredited persons:

- Initial Inspections (inspectors conduct initial inspections to identify and assess ACBM),
- Management Plan Development (management planners use the data gathered by inspectors to determine the ACBM's hazard, select the appropriate response actions, and develop a schedule for implementing response actions),
- Response Action Design, Supervision, and Implementation (abatement project designers determine how the asbestos abatement work should be conducted, and asbestos abatement contractors, supervisors, and workers carry out the abatement work), and
- Reinspections (inspectors conduct reinspection and reassess ACBM).

The LEA may either hire an accredited consultant to perform the inspections and prepare management plans or have a suitable school employee complete an appropriate EPA-approved training course. It may be more economical for a small school system with few buildings to hire an outside

inspector and management planner. Large LEAs, however, may find that it is more cost-effective to have a qualified staff member become accredited as an inspector and management planner and have this person perform inspections and develop management plans for all buildings. LEAs should carefully consider which option is best for their situation. Regional Asbestos Coordinators may be contacted to obtain a current list of EPA-approved training courses in the area (see Appendix B). EPA plans to update this list periodically. The training course organizers should be able to provide interested LEAs with a list of those who are accredited.

Additionally, LEAs must have accredited personnel furnish proof of accreditation. Proof could include a license from a State with an EPA-approved accreditation program, or a training course certificate that indicates the person successfully completed an EPA-approved course by passing the examination. **It is very important that LEAs keep a copy of all licenses and certificates which demonstrate that the person selected to perform any of the above tasks is accredited.**

The following activities do not require accredited persons:

- Periodic Surveillance [Section 763.92(b)],
- Operations and Maintenance (although custodial employees need training relative to their duties as specified in the New Rule) [Section 763.92(a)], and
- Designated Person Activities (although this person must receive specific training -- see Chapter 2) [Section 763.84(g)].

CONSIDERATION OF CONFLICT OF INTEREST

LEAs must consider the potential for conflicts of interest between accredited inspectors, management planners, and persons who design or conduct abatement actions for them. However, the resolution of such issues is at the discretion of the LEA.

EPA recommends that LEAs consider requesting a full financial disclosure from all accredited professionals they plan to hire. It may be more efficient for LEAs to use the same firm to conduct the inspections and develop the management plans in order to maintain continuity in the process. EPA anticipates that many LEAs will find this alternative cost effective. However, LEAs may not want to employ one firm to both develop the management plan and conduct response actions, because in that situation the management planner's recommendations about response actions could be influenced by the potential profitability of the recommendations.

The only conflict of interest explicitly not permitted by the New Rule involves the relationship between an accredited abatement contractor and individuals selected to conduct certain air sampling operations for clearance purposes. If the abatement contractor and the person conducting air sampling operations were from the same firm, the air monitoring results could be falsified to indicate a building is safe for re-occupancy and the abatement contractor's work is complete.

CHAPTER 4 - CONDUCT INITIAL INSPECTIONS

To determine if ACBM is present in school buildings, each LEA must use accredited inspectors to conduct inspections of all school buildings, whether owned or leased, for all friable and non-friable ACBM [Section 763.85(a)]. If friable ACBM or thermal system insulation ACBM with potential for damage is present, its condition must be assessed by the accredited inspector. The appropriate response action for each category is discussed in Chapter 6.

WHAT BUILDINGS ARE SUBJECT TO THE RULE?

Any school building owned or leased by the LEA must have an initial inspection conducted and a management plan developed and submitted to the State by October 12, 1988. LEAs should schedule their inspections early in order to be able to complete the management plan and submit the plan to the State by this date.

LEAs should consult the definition of "school building" in Section 763.83 of the New Rule for a more precise definition. In general, the term "school building" includes structures suitable for use as classrooms, laboratories, libraries, school eating and kitchen facilities, gymnasiums, and student dormitories. The term also includes administrative offices, and essential maintenance, storage, and utility facilities.

If a building is acquired or leased on or after October 12, 1988, an initial inspection must be conducted before the building is used as a school building. In the event that emergency use of an uninspected building as a school building is necessary, the LEA must conduct an inspection of the building within 30 days after first using the building [Section 763.85(a)(2)].

IDENTIFICATION OF AN ACCREDITED INSPECTOR

Each inspector must be accredited. This means that the individual must be trained and certified through an EPA-approved training course or an EPA-approved State accreditation program.

PROCEDURES FOR THE INITIAL INSPECTION

The purpose of an initial inspection is to locate all friable and non-friable ACBM in school buildings. Suspected ACBM includes surfacing material on ceilings used for insulation, acoustical, or decorative purposes; thermal system insulation on pipes and boilers; and miscellaneous materials such as floor and ceiling tiles. Asbestos-containing material (ACM) is material that has been tested by an accredited laboratory and found to contain more than one percent asbestos. For the purpose of compliance, any suspected material may be assumed to be ACBM. If the material is assumed to be ACBM, however, it must be treated as ACBM for all purposes.

Exhibit 4-1 presents the LEA's major steps for completing an initial inspection. Exhibit 4-2 summarizes the activities performed by accredited inspectors as part of an inspection.

EXHIBIT 4-1

THE LEA'S MAJOR STEPS TO COMPLETE AN INITIAL INSPECTION

- Select an accredited inspector, ❑
- Have the accredited inspector conduct an initial inspection of all areas of each school building, ❑
- Record and keep information about the location of any ACBM or assumed ACBM found by the accredited inspector (the LEA may keep information in a written description or in a drawing on a building plan or diagram), and ❑
- Include inspection information in the management plan (the LEA's Designated Person must oversee this assignment). ❑

EXHIBIT 4-2

ACTIVITIES PERFORMED BY ACCREDITED INSPECTORS DURING INSPECTION FOR ASBESTOS-CONTAINING BUILDING MATERIAL

INSPECTION FOR ACBM

- Inspect school buildings for the presence of any ACBM. ☐
- Determine if suspected ACBM is friable, ☐
- Identify all homogeneous areas for purposes of sampling. ☐

SAMPLING OF BULK MATERIALS

- Collect samples in each homogeneous area identified as suspected ACBM, unless the suspected material is assumed to be ACBM. ☐
- Submit samples to an accredited laboratory for analysis. ☐
- Although not required, it is advisable to send a portion of samples to a second lab as a quality assurance/quality control check. ☐

ASSESSMENT

- Evaluate all information to assess the physical condition of all friable ACBM and thermal system insulation ACBM with potential for damage. ☐
- Classify all friable ACBM and thermal system insulation ACBM with potential for damage into categories of damage as prescribed in the New Rule. ☐

DOCUMENTATION

- Document each step taken (a sample inspection form is found in Appendix D. However, any other appropriate documentation form created by the LEA and/or accredited inspector is acceptable). ☐
- Describe or map the locations of all confirmed or assumed ACBM. ☐
- Submit documentation to the LEA's Designated Person. ☐

Under certain conditions, it may not be necessary to conduct all or part of the initial inspection. An explanation of what areas of school buildings may be excluded is provided later in this chapter.

The sample inspection form in Appendix D is intended to provide general guidance regarding the content and format of inspection records and reinspection records. The format and length of inspection forms are at the discretion of the LEA. The sample form in Appendix D is used in one course that trains inspectors. All completed inspection forms must be given to, and maintained on file by, the LEA Designated Person, and incorporated into the management plan.

Each time ACBM is found, the accredited inspector must determine whether the ACBM is friable. Friable material may be crumbled, pulverized, or reduced to powder by hand pressure. Friable ACBM is more hazardous than non-friable ACBM because friable material can release airborne asbestos fibers more easily. Determining friability is important because friable ACBM must be assessed for damage and included in an operations and maintenance program.

ASSESSMENT OF ACBM

In order to help determine appropriate response actions, the accredited inspector must perform an assessment by classifying all friable ACBM and thermal system insulation ACBM with potential for damage into categories after each inspection or reinspection [Section 763.88]. These categories are:

- Damaged or significantly damaged thermal system insulation ACBM;
- Damaged friable surfacing ACBM;
- Significantly damaged friable surfacing ACBM;
- Damaged or significantly damaged friable miscellaneous ACBM;
- ACBM with potential for damage;
- ACBM with potential for significant damage; and
- Any remaining friable ACBM or friable assumed ACBM.

The inspector shall give reasons in the written assessment for classifying the material into these categories. To assess a school building completely, the inspector also must classify all friable ACBM identified in inspections made prior to the inspection required by the New Rule. Records of all inspection results must be maintained for inclusion in the management plan.

REQUIREMENTS FOR SAMPLING AND ANALYSIS

When an accredited inspector identifies friable or non-friable suspected ACBM during an inspection or reinspection, the LEA has the option to sample the material or assume the material is ACBM. All samples must be taken by an accredited inspector [Section 763.86]. LEAs must use accredited laboratories to analyze the samples [Section 763.87] (for information on laboratories call the appropriate EPA Regional Asbestos Coordinator listed in Appendix B or the Office of Toxic Substances Hotline listed in Appendix A).

EXCLUSIONS

Under certain conditions, all or part of a school building may be excluded from the initial inspection requirement. **LEAs should realize that exclusion from an initial inspection in no way excludes them from the requirement to submit a management plan.** Exclusions are based on the judgement of an accredited inspector who determines whether the results of previous inspections and sampling were adequate to determine the presence or absence of asbestos in specific areas of the school building [Section 763.99].

The accredited inspector generally is the key element in the exclusion process. In some instances, however, architects, project engineers, and employees of a State's lead agency responsible for asbestos inspection might be involved in the exclusion process.

It is very important to note that the accredited inspector must perform an assessment of areas that are excluded from an initial inspection if they contain friable ACBM. For example, areas of a school that previously were inspected and identified as containing friable ACBM under EPA's 1982 asbestos inspection rule must be assessed by the accredited inspector. However, schools may save on sampling costs if the accredited inspector certifies that an exclusion is appropriate.

There are six ways in which an LEA may be excluded from all or part of the requirement to conduct an initial inspection [Section 763.99]:

- LEAs do not need to have an initial inspection conducted in specific areas of a school where friable ACBM has already been identified. However, the friable ACBM must be assessed.

- LEAs do not need to conduct an initial inspection if sampling records show that non-friable ACBM was identified. However, the inspector must identify ACBM that has become friable. This newly friable material must now be assessed.

- If previous sampling of a specific area of the school indicated that no ACBM was present, and the sampling was done in substantial compliance with the New Rule, the LEA does not have to perform an initial inspection of that area.

- LEAs do not have to inspect specific areas of schools where records indicate that all ACBM was previously removed.

- LEAs can qualify for an inspection exclusion for schools built after October 12, 1988 (the date when management plans are to be submitted to Governors), if no ACBM was specified for use in the school.

- States that receive a waiver from the inspection requirements of the New Rule can grant exclusions to schools that have performed inspections in substantial compliance with the New Rule and found that no ACBM is present.

For most of these exclusions, the accredited inspector must review sampling and inspection records before he/she can certify that a school can be excluded from an initial inspection. If a representative of an LEA believes that it qualifies for one of these exclusions, he/she should consult an accredited inspector [Section 763.99]. Assistance on exclusions may be obtained from EPA Regional Asbestos Coordinators (see Appendix B).

CHAPTER 5 - DEVELOP A MANAGEMENT PLAN

IDENTIFICATION OF AN ACCREDITED MANAGEMENT PLANNER

The management planner must be accredited. The planner must be trained and accredited through an EPA or State accreditation program (see Chapter 3). LEAs may chose to use one person as both the accredited inspector and accredited management planner.

DEADLINES

October 12, 1988	By this date each LEA must develop an asbestos management plan for each school building under its administrative control, and submit it to the Agency designated by the State Governor [Section 763.93(a)] (see Appendix C).
July 9, 1989	Implementation of the plan must begin on or before this date and be completed in a timely fashion [Section 763.93(c)]. Timely fashion is based upon the schedule developed by the accredited management planner and the LEA.

MAJOR COMPONENTS OF THE MANAGEMENT PLAN

The following is a comprehensive checklist of the major elements of a management plan. For each school building, LEAs must use an accredited management planner to determine the specific format and content of that school's management plan. Individual management plans may differ from the checklist shown below. A checklist like this one may be used to help ensure that the required information is included in the plan [Sections 763.93(e) to 763.93(i)].

1. **Background information on the school**

   - Name and address of each school building ☐
   - Whether the building contains friable ACBM, non-friable ACBM, and friable and non-friable suspected ACBM assumed to be ACM ☐

2. **Information on the LEA Designated Person**

   - Name, address, and telephone number of the LEA Designated Person (see Chapter 2) ☐
   - The course name and dates of training taken by the LEA Designated Person ☐

3. For all inspections and reinspections conducted after the effective date of the regulations, i.e., December 14, 1987, the following **additional information must be included in the management plan** (for any inspections that were conducted before December 14, 1987, refer to the end of this section):

- **Background Data:**

  -- Date of the inspection or reinspection ☐

  -- Name, signature, accrediting agency, and a copy of the State license or training course certificate that includes the accreditation number of the accredited inspector performing the inspection or reinspection ☐

- **Sampling:**

  -- A blueprint, diagram, or written description of each school building clearly identifying each location and approximate square or linear footage of any homogeneous area where material was sampled for ACM ☐

  -- The exact description of the location where each bulk sample was collected ☐

  -- The dates of collection ☐

  -- The location of homogeneous areas where friable suspected ACBM is assumed to be ACM, and where non-friable suspected ACBM is assumed to be ACM ☐

  -- A description of the manner used to determine sampling locations ☐

  -- The name, signature, accrediting agency, and a copy of the State license or training course certificate that includes the accreditation number of each accredited inspector collecting samples ☐

- **Analyses:**

  -- A copy of the results of any bulk samples analyzed ☐

- -- The name and address of any laboratory that analyzed bulk samples ☐
- -- An official statement from the laboratory that it meets the accreditation requirements ☐
- -- Dates of any analyses ☐
- -- The name and signature of the person performing laboratory analyses ☐

- **Assessments:**
  - -- A description of assessments (see Chapter 4) of ACBM ☐
  - -- The name and signature, accrediting agency, and a copy of the State license or training course certificate that includes the accreditation number of each accredited person making assessments ☐

4. Management Plan Development

For each accredited management planner used to review the results of inspections, reinspections, and assessments in order to recommend response actions, the following information must be included in the plan:

- Name and signature ☐
- Accrediting agency and a copy of the State license or training course certificate that includes the accreditation number of the management planner ☐

5. Response actions

A detailed description of all response actions and preventive measures to be taken must be incorporated in the management plan (see Chapter 5), and should include the following information:

- Methods to be used for response actions ☐
- The locations where response actions will be taken ☐
- Reasons for selecting the response action or preventive measure ☐

- A schedule for beginning and completing each preventive measure and response action ☐
- A detailed description in the form of a blueprint, diagram, or in writing of the location of any ACBM or suspected ACBM assumed to be ACM that remains in the school once response actions are taken ☐
- An update of the detailed description of remaining ACBM as response actions are completed ☐

6. Follow-up to response actions

- Plan for reinspection (see Chapter 7) ☐
- Plan for periodic surveillance (see Chapter 7) ☐
- Plan for operations and maintenance ☐
- Description of the recommendation by the management planner regarding any additional cleaning required for operations and maintenance, and the response of the LEA to this recommendation ☐
- Evaluation of the resources needed to complete response actions and carry out reinspection, operations and maintenance activities, periodic surveillance, and training ☐

7. Statements of accreditation

Accreditation is required for all persons who conduct the inspection, develop the management plan, or who will design or carry out response actions with respect to ACBM, except for operations and maintenance activities. One of the following statements must be included in the management plan:

1. A statement that the person(s) is(are) accredited under an EPA-approved State contractor accreditation program in the State where the LEA is located (if that State has adopted a program). ☐
2. A statement that the LEA used, or will use, persons who have been accredited by another State that has adopted a contractor accreditation program or is accredited by an EPA-approved course. This applies if the State in which the LEA is located has not adopted its own EPA-approved accreditation program. ☐

8. Notification

The plan must include a description of steps taken to inform workers and building occupants, or their legal guardians, about the inspections, response actions, and post-response action activities, including periodic surveillance and reinspection activities that are planned or in progress. ☐

9. Statement of Assurance

Statement of assurance, signed by the LEA Designated Person, assuring that all school district responsibilities have been or will be fulfilled. ☐

Inspections conducted before December 14, 1987

For all inspections conducted before December 14, 1987, the effective date of the Rule, the following information regarding the inspection must be included in the management plan [Section 763.93(e)]:

Background Data:

- Date of the inspection ☐

Sampling:

- A blueprint, diagram, or written description of each school building clearly identifying each location and approximate square or linear footage of any homogeneous or sampling area where material was sampled for ACM ☐
- The locations of bulk sample collection and the dates of collection ☐

Analyses:

- A copy of any analysis results of bulk samples, including the dates of the analysis and a copy of any other laboratory reports pertaining to the analysis ☐

Assessments:

- A description of assessments (see Chapter 4) of material that was identified prior to December 14, 1987, as friable ACBM or friable suspected ACBM assumed to be ACM. This description should include the name and signature, accrediting agency, and a copy of the State license or training course certificate that includes the accreditation number of each accredited person making the assessments



Response Actions:

- A description of any response actions or preventive measures taken to reduce asbestos exposure, including the names and addresses of all contractors involved in such actions or measures, the start and completion dates of the contractors' work and, if possible, the results of any air samples analyzed during or upon completion of the work



NOTIFICATION OF MANAGEMENT PLAN AVAILABILITY

When submitting a management plan to the Agency designated by the State Governor, and annually thereafter, the LEA shall notify in writing the parent, teacher, and employee organizations of the availability of the plan. In the absence of such organizations, the LEA must give annual written public notice of the availability of the plan to the relevant groups. The LEA's management plan shall include a dated copy of this notification and a description of the steps taken to notify the appropriate groups [Section 763.93(g)].

CHAPTER 6 - IMPLEMENT APPROPRIATE RESPONSE ACTIONS

With the guidance of the management planner, the LEA must select appropriate response actions consistent with the assessment, and implement these actions in a timely manner. It is important for the LEAs to understand that the schedules which are developed for response actions, and included in their management plans, are enforceable by EPA. The presence of friable ACBM, or thermal system insulation ACBM with potential for damage, also requires the initiation of an operations and maintenance (O&M) program. The response action selected must protect human health and the environment, but the LEA may choose to implement the least burdensome response action from those actions that protect human health and the environment. LEAs may always choose to remove ACBM. Guidelines specified in the New Rule [Section 763.90] for choosing appropriate response actions are outlined below.

All supervisors, contractors, and workers who conduct response actions must be accredited. For assistance in locating accredited personnel, contact the nearest EPA Regional Asbestos Coordinator (see Appendix B).

RESPONSE ACTIONS

After assessments are made by an accredited inspector, the accredited management planner will provide the LEA with written recommendations regarding response actions. The LEA must select response actions and implement them in a timely fashion [Section 763.90]. All response actions, including removal, encapsulation, enclosure, or repair (other than small-scale, short-duration repairs) must be designed and conducted by persons accredited to design and conduct response actions. An LEA may draw upon its own personnel to carry out response actions, but they must be individually accredited. Below are the different categories of damage, each with its corresponding framework of response actions.

- Damaged or significantly damaged thermal system insulation ACBM:

  -- Repair the damaged area and maintain all thermal system insulation ACBM and its covering in an intact state and undamaged condition;

  -- Remove the damaged material if it is not feasible, due to technological factors, to repair the damage.

- Damaged friable surfacing ACBM or damaged friable miscellaneous ACBM:

  -- Encapsulate the ACBM (with a material that surrounds or embeds the asbestos fibers in an adhesive matrix to prevent the release of fibers);

-- Enclose the ACBM (with an airtight, impermeable, and permanent barrier to prevent the release of asbestos fibers into the air);

-- Remove the ACBM;

-- Repair the ACBM to an undamaged condition or to an intact state so as to prevent fiber release.

- Significantly damaged friable surfacing or miscellaneous ACBM:

  -- Immediately isolate the functional space and restrict access, unless isolation is not necessary to protect human health and the environment;

  -- Remove the material in the functional space or, depending on whether enclosure or encapsulation would be sufficient to protect human health and the environment, enclose or encapsulate the material.

- Any friable surfacing ACBM, thermal system insulation ACBM, or friable miscellaneous ACBM that has potential for damage:

  -- Implement an operations and maintenance program.

- Any friable surfacing ACBM, thermal system insulation ACBM, or friable miscellaneous ACBM that has potential for significant damage:

  -- Implement an operations and maintenance program;

  -- Implement preventive measures appropriate to eliminate the reasonable likelihood that the ACBM or its covering will become significantly damaged, deteriorated, or delaminated;

  -- Remove the material as soon as possible if appropriate preventive measures cannot be implemented effectively, or unless other response actions are determined to protect human health and the environment. Immediately isolate the area and restrict access if necessary to avoid an imminent and substantial endangerment to human health or the environment.

At the conclusion of any action to remove, encapsulate, or enclose ACBM, a person designated by the LEA shall visually inspect each functional space where

such actions were conducted to determine whether the action was completed properly. In addition, the LEA must select a qualified person to collect air samples to monitor air for residual asbestos levels. The requirements for air sampling, including mandatory analysis methods, are explained in Section 763.90 of the New Rule. A list of laboratories which are certified to conduct this testing can be obtained from the EPA Regional Asbestos Coordinators. (Air sampling is not required for response actions that are of small-scale, short-duration.) Because the LEA Designated Person is familiar with the asbestos control program, it would be reasonable for this person to oversee these tasks.

Under the New Rule, LEAs are responsible for ensuring that asbestos waste materials are transported and disposed of properly after response actions. The transport and disposal of asbestos waste must meet the requirements in the EPA publication "Asbestos Waste Management Guidance." Appendix D of the New Rule covers the necessary requirements, as they had originally been described in the Guidance publication. The Appendix requires schools to comply with the current EPA and Department of Transportation regulations in this area.

EPA is in the process of revising the requirements governing the transport and disposal of ACBM from schools. EPA expects to propose new regulations in March 1988 and issue final regulations during fall 1988. When finalized, these regulations will replace Appendix D, discussed above.

It is important to reiterate that several key items under the New Rule that relate to response actions are enforceable immediately. As of December 14, 1987, the following stipulations apply:

- Accredited persons must be used to design and conduct response actions.
- Successful completion of response actions must be verified by air monitoring [Section 763.90].
- Transportation and disposal of ACBM must be in accordance with the requirements of Appendix D of the New Rule.

OPERATIONS AND MAINTENANCE (O&M)

Whenever any friable ACBM or thermal system insulation ACBM with the potential for damage is present in a school building, it is necessary for the LEA to initiate O&M activities [Section 763.91]. Any material identified as non-friable ACBM must be treated as friable ACBM for the purposes of operations and maintenance when the material is about to become friable as a result of activities performed in the school building (for example, non-friable ACBM that is drilled or otherwise disturbed by remodeling, maintenance, or any other activities that would cause the release of fibers).

Initial Cleaning

Unless the school building has been cleaned using equivalent methods within the last six months, all areas of a school building where friable ACBM,

damaged or significantly damaged thermal system insulation ACBM, or friable assumed ACBM are present shall be cleaned at least once after the completion of the initial inspection and before the initiation of any response action, other than O&M activities and repair [Section 763.91(c) for specific procedures].

O&M Activities

Whenever an O&M activity disturbs friable ACBM, the LEA must protect building occupants by enforcing the following procedures [Section 763.91]:

- Restrict entry into the area by persons other than those necessary to perform the O&M action. ❑
- Post signs to prevent entry into the area by unauthorized persons. ❑
- Shut off or temporarily modify the air-handling system and restrict other sources of air movement. ❑
- Use work practices or other controls to inhibit the spread of any released fibers. ❑
- Clean all fixtures or other components in the immediate work area. ❑
- Seal the asbestos debris and other cleaning materials in a leak-tight container and dispose of properly. ❑

Fiber Release Episodes

O&M activities resulting from minor fiber releases from friable ACBM (falling or dislodging of 3 square or linear feet) require specific cleaning and maintenance procedures [Section 763.91(f)].

Major fiber release episodes, those of more than three square or linear feet of friable ACBM, or maintenance activities other than small-scale, short-duration, are <u>not</u> considered O&M activities. These activities must be designed and conducted by persons accredited to conduct response actions [Section 763.91(e)(f)].

Worker Protection

Employees of LEAs who perform O&M activities, but are not covered by the Occupational Safety and Health Administration (OSHA) asbestos construction standard [29 CFR 1926.58] or a State standard for asbestos worker protection, are provided OSHA-type protection by EPA [Section 763.91(b)].

CHAPTER 7 - CONDUCT PERIODIC SURVEILLANCE AND REINSPECTIONS

PERIODIC SURVEILLANCE

At least once every six months after a management plan is in effect, each LEA must conduct periodic surveillance in each school building that contains ACBM. The person conducting periodic surveillance, the monitor, does not have to be an accredited inspector. However, the monitor should be familiar with the school building in order to be able to accurately perceive any changes in the condition of all ACBM that is identified in the management plan. A custodian or maintenance worker may be a suitable monitor. The monitor must record the date of the surveillance, his or her name, and any observable changes in the condition of the material (e.g., water damage). The monitor must submit a copy of this information to the LEA's Designated Person, who must include these records in the management plan [Section 763.92(b)].

It would be very beneficial to have the same individual conduct these surveillance activities because the same person would be much more likely to notice changes in the condition of ACBM. If a person who is unfamiliar with the school building conducts periodic surveillance, he or she needs to look at the records of the most recent periodic surveillance and the most recent inspection or reinspection. This review will help the monitor detect any changes in the condition of ACBM in the building that have occurred.

REINSPECTIONS

At least once every three years after a management plan is in effect, each LEA must have an accredited inspector reinspect all friable and non-friable ACBM, and have the accredited inspector reassess specific materials in each school building [Section 763.85(b)]. Reinspections help keep track of the physical condition of the ACBM. In the event that no asbestos was found in a specific school building during the initial inspection, reinspection of that building is not required.

As stated above, to ensure that the condition of ACBM is scrutinized adequately, an accredited inspector must perform all reinspections and reassessments. The primary purpose of the initial inspection is to locate all ACBM. Each reinspection provides an opportunity to identify and respond to changes in the condition of ACBM. Results of these reinspections must be included in the school's management plan.

CHAPTER 8 - ASSURE PROPER TRAINING AND AWARENESS

TRAINING OF CUSTODIAL AND MAINTENANCE WORKERS

Before implementing the operations, maintenance, and repair provisions of the management plan, the LEA must ensure that all members of its maintenance and custodial staff (custodians, electricians, heating/air conditioning engineers, plumbers, etc.) who may work in a building that contains ACBM receive general awareness training of at least 2 hours' duration, whether or not they are required to work with ACBM. New custodial staff and maintenance employees who are hired after the implementation of the management plan must be trained within 60 days after commencement of employment [Section 763.92(a)]. Training must include at least these elements:

- Information regarding asbestos and its various uses and forms;
- Information on health effects associated with asbestos exposure;
- Locations of ACBM identified throughout each school building in which they work;
- Recognition of damage, deterioration, and delamination of ACBM;
- The name and telephone number of the LEA's Designated Person; and
- The availability and location of the management plan.

The LEA must ensure that members of its maintenance and custodial staff who conduct any activities that may result in the disturbance of ACBM receive the awareness training outlined above, plus 14 hours of additional training covering [Section 763.92(a)(2)]:

- proper methods of handling ACBM;
- the use of respiratory protection;
- other personal protection measures; and
- hands-on training in good work practices.

As of December 14, 1987, LEAs must ensure that their custodial and maintenance staff members receive this training prior to conducting activities that may disturb asbestos.

LEA maintenance and custodial staff who have attended EPA-approved asbestos training courses or received equivalent training for O&M and periodic surveillance activities involving asbestos, are considered trained and do not require any additional training.

PROVIDING INFORMATION REGARDING THE LOCATION OF ACBM TO SHORT-TERM WORKERS

It is the duty of the LEA's Designated Person to make sure that the LEA provides information regarding the location(s) of ACBM and assumed ACBM in school buildings to short-term workers such as telephone repair workers or building repair contractors.

POSTING WARNING LABELS

The LEA Designated Person must make sure that warning labels are attached immediately adjacent to any friable and non-friable ACBM in routine maintenance areas (such as boiler rooms) of each school building. Such material includes friable ACBM that was responded to by a means other than removal, for example, encapsulation, and ACBM for which no response action was carried out. Classrooms, libraries, and cafeterias are a few examples of rooms that are not considered routine maintenance areas.

All labels must be displayed prominently in readily visible locations and remain posted until the ACBM that is labeled is removed. Warning labels must be made readily visible with large print or bright color, and shall read as follows:

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

CHAPTER 9 - MAINTAIN RECORDS

Each LEA is required to keep in its administrative office a copy of the management plan that was submitted to the Agency designated by the State Governor. If changes are made based on the State review, each LEA is required to keep the revised management plan on file in the LEA office. In addition, each school is required to keep a copy of its own management plan. Records of all activities performed after the original plan was submitted to the Governor must be collected and made available to the public for inspection.

The public may request the LEA to provide all information gathered during inspections, reinspections, and periodic surveillance, as well as general information regarding the LEA's asbestos control program [Section 763.93(g)].

RECORDKEEPING OF MANAGEMENT PLAN

- Each LEA must keep an updated copy of the management plan in its administrative office for each school under its administrative control or direction. This plan must be available, without restriction, to the public, school personnel and their representatives, parents, and representatives of EPA and the State, for inspection during normal business hours. ❑

- Each school must keep in its administrative office an updated copy of the management plan for that school. The school must make the management plan available for inspection. ❑

- Each LEA and school must keep accurate records of relevant events with the management plan. ❑

RECORDKEEPING OF OTHER INFORMATION

Records must be kept of all relevant events occurring after submission of the management plan. These records become part of the management plan. The relevant events include:

1. Response actions and preventive measures.
2. Training of personnel.
3. Periodic surveillance.
4. Reinspection and assessments.
5. Cleaning activities.
6. Small-scale, short-duration operation and maintenance activities.

7. All operations and maintenance activities other than small-scale and short duration activities.

8. Fiber release episodes.

All records shall be retained in the administrative offices of both the LEA and the school as part of the management plan. For each area where ACBM has been removed, the records must be kept for 3 years after the next required reinspection [Section 763.94(a)]. The records that must be maintained are presented in Exhibit 9-1 in the form of a checklist.

EXHIBIT 9-1

RECORDKEEPING CHECKLIST

1.	For any response action or preventive measures taken for ACBM: a detailed description of the actions and information on sample analysis [see Section 763.94(b)].	☐
2.	For each person required to be trained: their name and job title, as well as information on their training.	☐
3.	For each periodic surveillance that is conducted: the name of each person performing the surveillance, the date of the surveillance, and any changes in the condition of the materials.	☐
4.	For each reinspection: the name and accreditation information of the inspector, the date of the reinspection, and any changes noted in the condition of the material.	☐
5.	For each required cleaning: the name of the person performing the cleaning, the date of the cleaning, the locations cleaned, and the methods used.	☐
6.	For each small-scale and short-duration operation and maintenance activity: the name and signature of the person performing the activity, the activity start and completion dates, the precise locations, a description of the activity and any preventive measures taken, and if ACBM is removed, the name and location of the storage or disposal site.	☐
7.	For maintenance activities other than small-scale and short-duration activities: the name and signature of the person performing the activity; their State of accreditation and, if applicable, the accreditation number of each person doing the activity; the activity start and completion dates; the precise locations; a description of the activity and any preventive measures; and if ACBM is removed, the name and location of the storage or disposal site.	☐
8.	For each fiber release episode: the date and location of the release, the method of repair, the preventive or response actions taken, the name of each person performing the work, and if ACBM is removed, the name and location of the storage or disposal site.	☐

CHAPTER 10 - COMPLY WITH THE NEW RULE

DEADLINES

The introduction to this Guide outlines the major deadlines associated with the New Rule. Figure 10-1 presents an overview of this information. As this figure indicates, LEAs must take a number of steps this year to comply with the New Rule.

PENALTIES

The Toxic Substances Control Act (TSCA) Title II, Section 207(a) provides civil penalties of up to $5,000 per violation per day [Section 763.97(a)] when an LEA:

- Fails to conduct inspections in a manner consistent with this Rule.
- Knowingly submits false information to the designated State Agency.
- Fails to develop a management plan in a manner consistent with this Rule.

In the New Rule, a "violation" means a failure to comply with respect to a single school building. TSCA Title I, Section 16 provides authority to issue to persons other than LEAs civil penalties of up to $25,000 per day for each violation of AHERA (TSCA Title II). Such persons may include those who design and conduct response actions and are not accredited under AHERA, and laboratories that perform air testing that are unaccredited or do not follow the specified protocol.

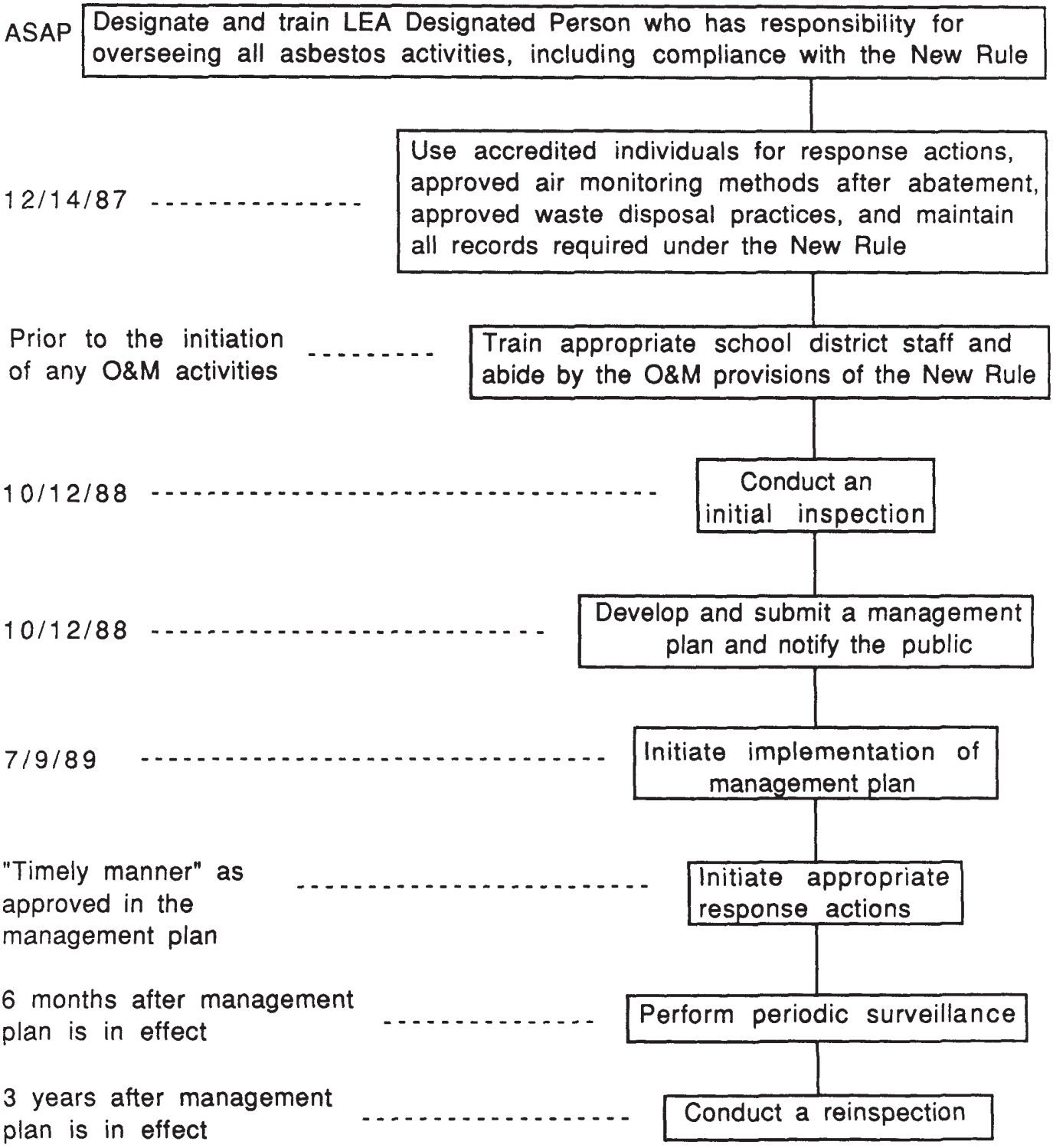
Criminal penalties may be assessed if any violation committed by any person (including an LEA) is knowing or willful [Section 763.97(c)].

NOTICE

Reading this Guide should not be considered a substitute for reading the New Rule (40 CFR Part 763 Subpart E); this Guide supplements the Rule and LEAs should refer to the Rule for specific details. Copies of the Rule are available from the EPA Regional Asbestos Coordinator. LEAs are encouraged to seek assistance from their EPA Regional Asbestos Coordinator and their designated State agency (see Appendices B and C).

FIGURE 10-1

SCHEDULE FOR MAJOR REQUIREMENTS OF THE NEW RULE



United States
Environmental Protection
Agency

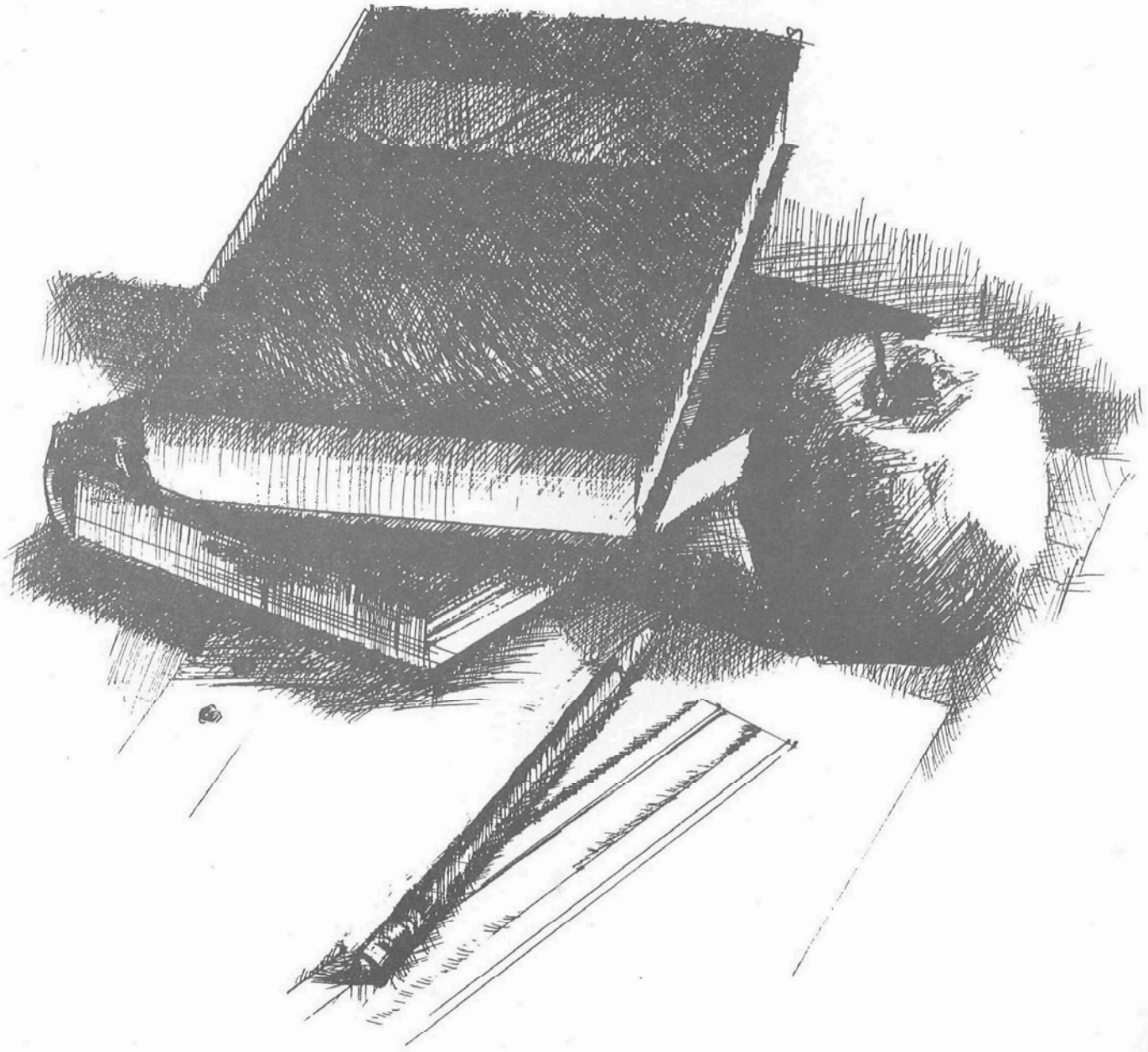
Office of
Toxic Substances
Washington, D.C. 20460

EPA 560/4-91-012
June 1991

Office of Toxic Substances

EPA

Asbestos in Schools: Evaluation of the Asbestos Hazard Emergency Response Act (AHERA): A Summary Report



Asbestos in Schools: Evaluation of the Asbestos Hazard Emergency Response Act (AHERA): A Summary Report

By:

Alexa Fraser
Robert Clickner
Naomi Everett
Susan Viet

Westat, Inc.
1650 Research Boulevard
Rockville, MD 20850

Prepared for:

Economics and Technology Division
U.S. Environmental Protection Agency
Washington, D.C. 20460

June 1991

TABLE OF CONTENTS

Chapter		Page
1	INTRODUCTION	1-1
2	IDENTIFICATION AND ASSESSMENT OF MATERIAL	2-1
3	MANAGEMENT PLAN EVALUATION	3-1
4	RESPONSE ACTION EVALUATION	4-1
5	ORIGINAL AHERA INSPECTION EVALUATION	5-1
6	PROCESS OF NOTIFICATION	6-1
7	MAINTENANCE AND CUSTODIAL WORKER TRAINING AND EXPERIENCE	7-1
8	GLOSSARY	8-1

List of Exhibits

Exhibit		Page
2-1	Universe of suspect materials in school buildings	2-1
2-2	Percent of suspect materials identified	2-2
2-3	Percent of suspect material quantities identified	2-3
2-4	Percent of buildings with asbestos-containing material quantity properly estimated	2-4
2-5	Percent of areas with suspect materials present and recorded in management plans	2-5
3-1	Management plan completeness scores by sub-area	3-1
3-2	Management plan completeness scores	3-2
3-3	Number of usability elements found in management plans	3-3
4-1	Recommended response actions	4-2
4-2	Percent of school buildings with one or more remediations	4-3

List of Exhibits (continued)

Exhibit		Page
4-3	Adequacy of remediations	4-3
5-1	School average inspection scores	5-2
7-1	Percent of schools providing some training to maintenance workers	7-2
7-2	Percent of schools providing some training to custodians	7-2
7-3	Percent of schools providing various lengths of training to maintenance and custodial workers	7-3

1. INTRODUCTION

In Fall 1989, the United States Environmental Protection Agency's (EPA's) Office of Toxic Substances asked Westat, Inc., a survey research firm, to perform an evaluation of the initial implementation of the Asbestos Hazard Emergency Response Act (AHERA). The AHERA regulations called for the inspection of all elementary and secondary schools in the nation to identify any asbestos-containing building materials (ACBM) present, preparation of an asbestos management plan for each school, notification of parents and staff of the availability of the management plan for review, training of school maintenance and custodial workers, and other long-term tasks.

The AHERA evaluation study focused on occupied school buildings in the United States with students in any of grades 1 through 12. There were a few exclusions: buildings constructed after October 1988,[1] buildings where the original AHERA inspection found no asbestos, and buildings where no inspection was conducted in response to AHERA or where no management plan was prepared. Westat estimates that the schools in the target population, from which the sample for this evaluation was drawn, represent approximately 80 percent of all 106,000 schools in the nation.

The AHERA evaluation was conducted in a national statistical sample of 30 communities, in which Westat visited a total of 198 schools and 207 school buildings. Participation in this evaluation was voluntary and approximately 25 percent of the originally sampled schools elected not to participate. Specially selected and trained inspectors thoroughly reinspected[2] each participating school building; their findings were compared with the original AHERA inspection at each school as reported in the school's management plan. In-person interviews were conducted with each school principal and AHERA designated person (ADP) for each Local Education Agency (LEA). In addition, telephone interviews were conducted with the inspector who had performed the original AHERA inspection, the head of the PTA (or other active parent), and an active teacher in the school.

In both the original AHERA inspections and the Westat reinspections, the inspectors looked for suspect building materials. Suspect building materials are construction materials thought to contain asbestos because of past practices in their formulation and manufacture. Laboratory analysis of a bulk sample is required to determine if a particular suspect material in fact contains asbestos. Since AHERA required the identification of suspect material, bulk sampling

[1] Any building constructed after this date was not required to be inspected under AHERA. These buildings must, however, have a signed statement by the building's architect, project engineer, or an accredited inspector stating that no ACBM was specified or used in construction.

[2] For purposes of this report, reinspection refers to the work done under this evaluation and not the triennial reinspection.

was not needed as part of this evaluation. Instead, we focused on evaluating how well the original AHERA inspections identified, assessed, described, and quantified suspect materials. (AHERA does not require bulk sampling. Suspect material may be treated "as if" it contains asbestos.)

To supplement the statistical data, a number of focus groups (i.e., guided group discussions for in-depth exploration of a topic) were undertaken in communities nationwide. Four focus groups were held with parents and teachers not associated with schools in our sample. In addition, five focus groups were held with school maintenance and custodial workers also not associated with our sampled schools. In both cases, participants in the focus groups were selected in a non-random, non-statistical manner. Rather, as is usually the case in a focus group, participants were invited purposefully to create a group with many different types of people. While this small sample of focus groups is not a reliable basis for statistical estimates (and has not been used in such a way), it did provide useful qualitative insights into the notification process and maintenance and custodial training and experience.

The AHERA evaluation assessed the implementation of the initial phase of AHERA and did not attempt to study compliance with all elements of the AHERA legislation. First, schools that did not have a management plan were excluded, thus separating out this category of noncompliers. Second, certain activities required under AHERA were not evaluated. These included reviewing the "process" of carrying out response actions, such as verifying that appropriate containments were used when required and appraising Operations and Maintenance (O&M) Plans. Also, not all possible suspect items were included in the suspect materials category for this evaluation. For example, wallboard, cement and cinderblock, and flooring under wall-to-wall carpeting were excluded from the study, though they are included in AHERA.

Although we considered monitoring the air for asbestos fibers, we rejected it in favor of inspection and assessment of building materials that could potentially release asbestos fibers. This approach was used for two reasons. First, because the AHERA regulations specifically call for the inspection and assessment of building materials in schools, we wanted to determine how well this was done. In this sense, AHERA serves primarily as a preventive measure to ensure that existing asbestos in schools does not become friable or present a future exposure source. Second, since air monitoring covers a short period of time, sometimes air monitoring shows no asbestos fiber release, even though release can occur when asbestos-containing materials are disturbed (through contact, maintenance, renovation, etc.). Thus, air monitoring could miss the times that fibers are released. AHERA is concerned with preventing not only current asbestos fiber release, but potential future release as well.

The AHERA evaluation research consisted of six separate Research Areas. Each Research Area addressed a different aspect of the AHERA program: school building inspections, management plans, response actions, original AHERA inspection evaluation, notification, and maintenance and custodial worker training. The EPA, in consultation with Westat and the technical consultants who worked on this project, developed specific research questions for each Research Area. The goal of the evaluation re-

search was then to collect and analyze data to answer the questions. A summary of the research questions and the study findings is presented in the following six chapters.

The statistical estimates presented in this report were derived through the use of standard statistical packages. They are often followed by a number in parentheses, for example, "... 80 percent (± 6%) of schools nationally ..." The number in parentheses may be used to form a 95 percent confidence interval[3] for the estimated value. In the example, the 95 percent confidence interval would be 74 percent to 86 percent, and there is one chance in 20 that the difference between the estimate and the unknown population parameter exceeds 6 percent.

For greater detail, the full findings of the evaluation have been published by EPA under the title *Evaluation of the Asbestos Hazard Emergency Response Act (AHERA) Final Report*. The publication number is 566/4-91-013. Additional information concerning this, and other reports, can be obtained through the TSCA Assistance hotline. The number is (202) 544-1404.

[3]A confidence interval is a measure of the statistical precision of the estimate. Roughly, we are 95 percent confident that the ranges defined by the limits of the confidence interval include the unknown population parameter. More precisely, 19 samples out of 20 will yield computed intervals that include the estimated parameter.

2. IDENTIFICATION AND ASSESSMENT OF MATERIAL

- *Was all the suspect material found at the original AHERA inspection?*
- *Was the asbestos found at the original AHERA inspection properly assessed?*

The goal of this Research Area was to estimate how much of the suspect material was found in the original AHERA inspections and how much of the asbestos-containing material was assessed in conformance with AHERA regulations. "How much" was measured in three ways:

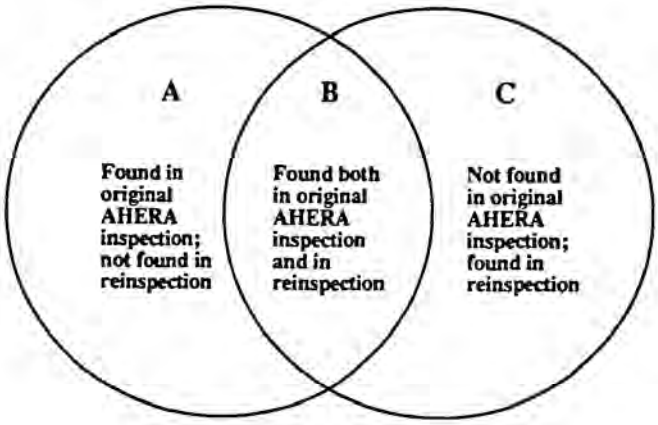
(1) **How many** of the individual suspect materials in school buildings were identified;

(2) **To what extent quantities** of identified materials were properly estimated; and

(3) **What percentage of the areas** with each type of suspect material was recorded in the original AHERA inspection.

Exhibit 2-1 illustrates the universe of suspect materials in school buildings and some of the difficulties inherent in evaluating building inspections after the passage of several months or more. Areas A, B, and C together represent the universe of suspect materials in school buildings at the time of the original AHERA inspection. The circle on the left (areas A and B) represents materials found in the original AHERA inspection. The circle on the right (areas B and C) represents materials found in the reinspection.

Exhibit 2-1.
Universe of suspect materials in school buildings[1]



[1]Diagram for illustration only. Ratios in actual data not shown.

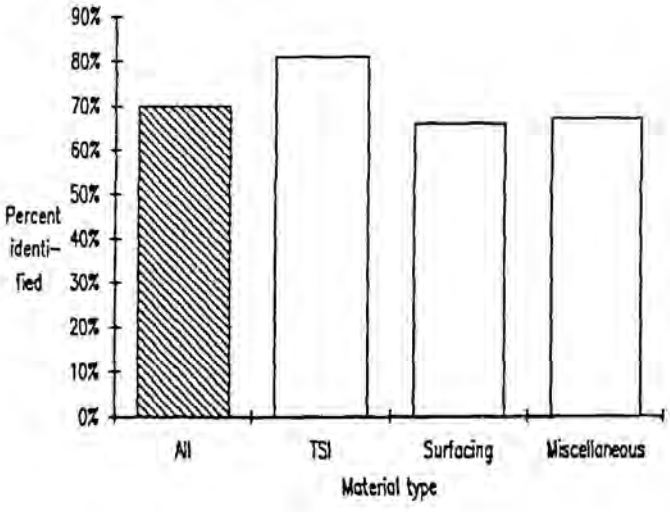
To estimate the percent of suspect materials identified in the original AHERA inspections, it is necessary to make two assumptions. First, materials found in the original AHERA inspection, but not in the reinspection (area A) are assumed to have been removed in the interim between the two inspections. Second, materials found in the reinspection but not in the original AHERA inspection (area C) are assumed to have been missed in the original inspection, rather than added after the original inspection. Under these assumptions, the ratio $\frac{A+B}{A+B+C}$ provides an estimate of the percent of suspect materials identified in the original inspections. In addition, we would also like to estimate the fraction of total quantity that the original inspector found for square or linear feet. Unfortunately, the quantity already abated (A) is not known. However, we can calculate $\frac{B}{B+C}$ as a lower bound on $\frac{A+B}{A+B+C}$. These lower bound estimates are reported later in this section.

Identification of Materials. We first address how well the original AHERA inspections identified suspect materials. Suspect asbestos-containing materials include every material in a school building which has not been sampled and analyzed by a NVLAP-accredited laboratory[2] for asbestos content. Suspect asbestos-containing building materials include specific thermal insulation, surfacing, and miscellaneous materials (defined by the EPA in the AHERA regulation and supporting documents) which have not been sampled and analyzed by a NVLAP-accredited laboratory for asbestos content. Asbestos-containing materials and asbestos-containing building materials are those materials which have been sampled and analyzed by an accredited laboratory and found to contain more than one percent asbestos.

The question of how well the original AHERA inspection identified suspect materials is important because, if a material was not identified, it was not sampled to determine asbestos content. Moreover, it would not have been included in the asbestos management program, even if it contained asbestos.

An estimated 70 percent of the 971,000 individual suspect materials still present in school buildings at the time of reinspection was identified in the original AHERA inspections; 72 percent of the 506,000 suspect friable materials was identified. Thermal system insulation (TSI) was more likely to be identified than either miscellaneous or surfacing materials (see Exhibit 2-2).

Exhibit 2-2.
Percent of suspect materials identified



[2]National Voluntary Laboratory Accreditation Program, a proficiency program for laboratories that perform bulk sample analysis by polarized light microscopy, established by the National Institute of Science and Technology.

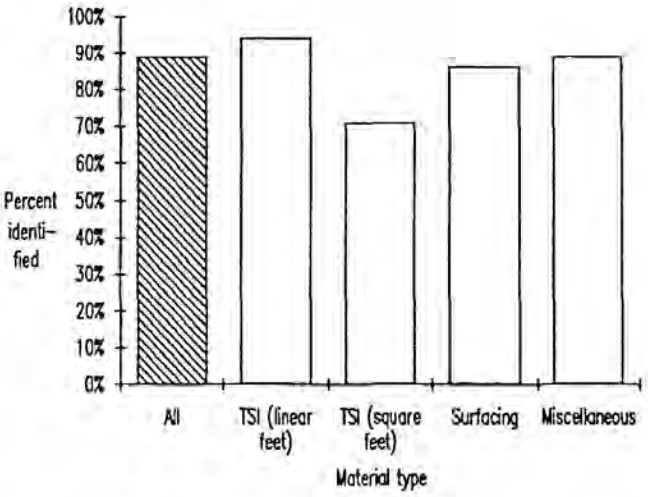
Many types of materials were identified in the vast majority of inspections, including floor tile, ceiling tile, and all types of thermal system insulation. However, certain types of materials were not regularly identified: vibration dampening cloth, fire doors, and linoleum.

When the numbers of the individual suspect materials identified were translated into quantities, 89 percent of the 4.7 billion square feet of suspect material present was identified. Suspect materials are generally quantified as square feet of surface covered by the material. A few materials, most notably pipe wrap, are quantified as linear feet of insulated pipe; 94 percent of the 89 million linear feet present of these materials was identified. (As discussed above, these quantity estimates are lower bounds.)

Over 90 percent of the total amount each of the following materials was identified in the original AHERA inspections: floor tile, ceiling surfacing material, and several categories of thermal system insulation--tank insulation, elbow/fitting/valve insulation, pipe insulation, and boiler insulation (see Exhibit 2-3). Materials that were highly likely to be identified accounted for most of the quantity of material. For example, there is an estimated 1.8 billion square feet of floor tile in the schools, 245 million square feet of ceiling surfacing material, and 65 million linear feet of pipe insulation. The least frequently identified suspect materials were vibration dampening cloth, fire doors, duct insulation, and linoleum. Less than 50 percent of these materials was identified in the original AHERA inspections. These least frequently identified materials tend to be small quantity materials. Together, they account for an estimated 59 million square feet of suspect material present in schools, of which only 19 million square feet is friable.

Despite the relatively high percentage of materials identified and material quantities reported,

Exhibit 2-3.
Percent of suspect material quantities identified



82 percent of school buildings[3] had at least one material unidentified in the original AHERA inspection. As would be expected from the previous paragraph, the unidentified materials tended to be the small quantity and nonfriable materials, such as vibration dampening cloth or fire doors. On the other hand, while ceiling tile and floor tile are present in about 85 percent of schools, they were not identified in 23 percent and 11 percent, respectively, of the school buildings containing them.

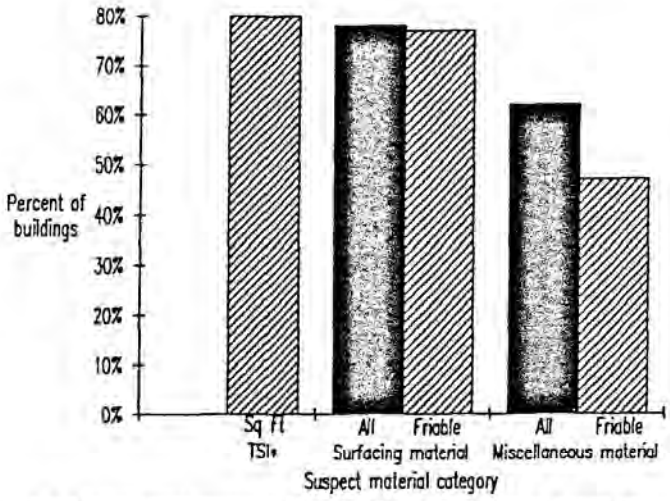
Estimation of Material Quantities. We examined the original AHERA inspector's ability to provide accurate information about the quantities of identified materials. Local Education Agencies need reasonably accurate quantifica-

[3]Some schools have more than one building.

tions of the asbestos materials in their schools to be able to estimate the costs of remediations. In determining underestimated amounts of material, we recognized that deviations in measurement among inspectors are fairly broad. Our expert consultants agreed that an original AHERA inspection quantity within 20 percent of the reinspection quantity should be considered an acceptably accurate estimate. Further, underestimated amounts calculated in this manner would clearly be attributable to the original AHERA inspector, rather than to differences in such factors as material description or architectural nomenclature.

Original AHERA inspectors estimated the quantity of each asbestos-containing material correctly in over 60 percent of buildings (see Exhibit 2-4).

Exhibit 2-4.
Percent of buildings with asbestos-containing material quantity properly estimated



*TSI is always considered friable; 83% of buildings had TSI measure in linear feet.

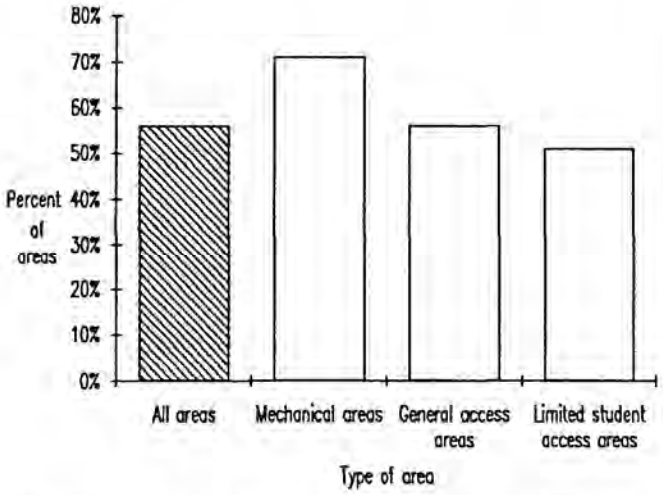
The overall quantity of asbestos-containing material estimated properly ranged from 91 percent (for thermal system insulation) to 45 percent (for friable miscellaneous materials). Our estimates for friable asbestos-containing miscellaneous materials and TSI are both based on so little data as to be subject to considerable error. More buildings have properly estimated quantities of asbestos-containing surfacing materials and thermal system insulation (about 75%) than miscellaneous materials (about 50%).

Recording Material Locations. This section continues the analysis of the original AHERA inspectors' ability to provide accurate information about identified materials. It addresses the question, "For materials which were identified at the original AHERA inspection, was every area where the material was present recorded?" AHERA requires the locations of suspect materials to be clearly indicated in the management plan by blueprints, diagrams, or written description so that school employees and parents can have reliable information about the location of asbestos-containing materials. In particular, school maintenance workers should know where to use appropriate work practices to protect themselves from potential exposure to asbestos fibers and where such work practices are unnecessary. Clear records of the locations of asbestos-containing materials and non-asbestos materials give workers information for differentiating among similar materials.

Areas in school buildings were divided into three types for this analysis: **mechanical areas**, which include boiler rooms, elevator shafts, mechanical rooms, air and duct shafts, telephone closets, and electrical closets; **limited student access areas**, which include offices, supply rooms, teachers' lounges, janitors' closets, and kitchens; and **general access areas**, which include classrooms, gymnasiums, auditoriums, cafeterias, restrooms, and hallways.

Once a material was identified, original AHERA inspectors recorded its location in 56 percent of the areas where the material was present (Exhibit 2-5). This reflects a tendency among inspection reports to either not indicate areas where materials are present or to do so incompletely. There were no patterns of differences between areas with limited student access and general access areas in recording locations of material.

Exhibit 2-5.
Percent of areas with suspect materials present and recorded in management plans



For all three types of areas, surfacing and miscellaneous suspect materials were recorded in about 45 to 55 percent of the areas where they were located. On the other hand, thermal system insulation was significantly more likely to be recorded in mechanical areas than in nonmechanical areas. It was recorded in 74 percent (± 10%) in mechanical areas, in 48 percent (± 10%) of general access areas, and in 57 percent (± 7%) of limited student access areas.

Assessment of the Asbestos-Containing Material. This component of the AHERA evaluation checks the internal consistency of the management plan's logic and whether it complies with AHERA's assessment classification of materials. No comparisons were made between assessment categories reported in the management plans and the categories observed in the reinspection. Such comparisons would not be valid because there were numerous opportunities for changes in the assessment category in the year or two between the inspections. Materials may have been repaired or removed or, conversely, they may have suffered further damage or deterioration.

The first part of this analysis considers how often asbestos-containing materials were assessed appropriately in the original AHERA inspection. Assessment refers to the consideration of factors that may contribute to increased fiber release from a material. An assessment is appropriate if, at a minimum, it considers the condition of a material or amount of damage to thermal system insulation and other friable materials. An inappropriate assessment was one in which a damage rating was not included. AHERA regulations do not require nonfriable materials to be assessed, although this was occasionally done. Assessed nonfriable materials were included in the count of total number of materials assessed and were counted as appropriately assessed. Ninety-two percent of the asbestos-containing materials that should have been assessed according to AHERA were indeed assessed and were assessed appropriately.

The second part of this analysis addresses how often the seven AHERA assessment categories were employed in the original AHERA inspection and how often they were appropriately assigned. An appropriate assessment means the ori-

ginal AHERA inspector assigned the AHERA catgory number (1 through 7) or wording correctly, based on material type, reported amount of damage at the original inspection, and reported potential for damage. Forty-four percent of original AHERA inspections used the AHERA categories. Of those inspections which used the categories, 93 percent applied them appropriately.

3. MANAGEMENT PLAN EVALUATION

- *Do schools know and understand the regulation, as shown by the completeness of the management plan?*

This Research Area seeks to evaluate management plans nationwide. Westat considered five aspects of each management plan:

- Completeness
- Usability
- Detractions to use
- Correct use of terms
- Educational background required to interpret plan

Completeness. In consultation with technical consultants and two senior certified industrial hygienists (CIH), Westat designed and implemented a methodology to score each plan for completeness. The scores provided a method of comparing management plans from different schools. The methodology awarded points for the presence of selected features called for in the EPA's guidance documents for management plan preparers (see six sub-areas listed in Exhibit 3-1). The points were converted to scores ranging from 0 to 100 percent. All scoring was assigned by two senior CIHs who are also trained AHERA inspectors and management planners with many years of experience in asbestos abatement and inspection.

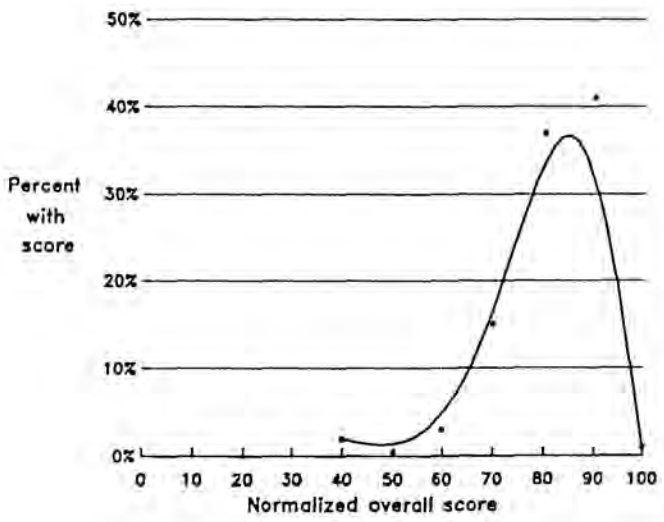
Based on the six subscores, an overall score was computed for the total management plan. The relative importance of each sub-area is reflected in its contribution to the overall score. For example, 6 percent of points in the overall score are based on the general inventory of buildings. The sub-areas, the relative importance of each, and the average score for the sub-area are provided in Exhibit 3-1.

Exhibit 3-1. Management plan completeness scores by sub-area

Sub-area of Completeness Score	Relative Importance	Average Score
General inventory of buildings	6%	92%
Exclusions and previous inspection information	42%	77%
Response action recommendations	18%	77%
Activity plans	24%	79%
Resource evaluation	6%	82%
Information on AHERA designated person	4%	86%
Overall	100%	81%

As shown in Exhibit 3-2, in regard to the overall score, management plans were generally complete with an overall average score of 81 percent. Most scored 75 percent or higher. However, 5 percent (± 4%) of management plans scored 64 percent or below, making it clear that a few plans, even with Federal and State guidelines, were substantially incomplete. Points were most commonly lost for items that were not clearly defined in AHERA, or where State-required AHERA forms and checklists failed to prompt for the specific information.

Exhibit 3-2.
Management plan completeness scores



Of particular interest and importance were the findings concerning the use of exclusion and previous inspection information. This was the single most important area evaluated for completeness in the plan. While a majority of the plans received the maximum points allowed under this heading, deficiencies were clustered in the areas that follow. (The percentage of plans nationally with the named deficiency are noted in parenthesis. The last two deficiencies were observed but not quantified.)

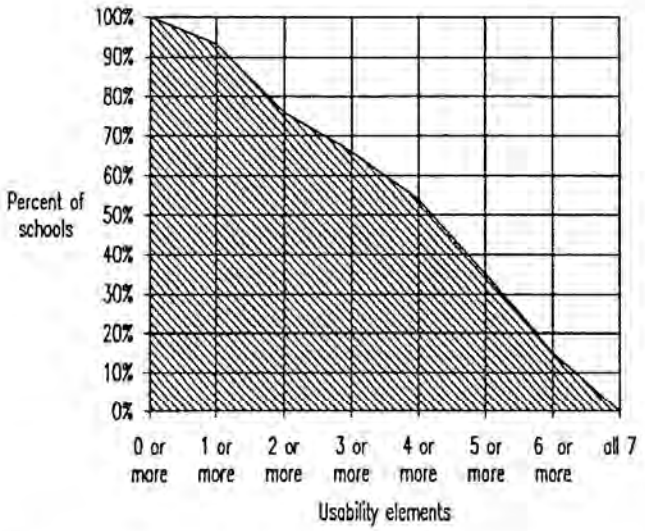
- Location of homogeneous areas not clearly described (42%)
- Nonstandard or insufficient identification of material type (55%)
- Insufficient description of bulk sampling locations (66%)
- Bulk samples collected from incorrect or undescribed locations (33% TSI, 58% surfacing)
- Date of analysis of bulk samples missing (31%)
- Failure to meet AHERA requirements when previous inspection results were used in the original AHERA inspection
- Insufficient evidence of EPA-approved accreditation for laboratories evaluating bulk samples

Usability. The second aspect of the management plan evaluation concerned usability. Westat evaluated how useful a plan would be and whether it could easily be used as a reference by its intended audiences, the public, and custodial and maintenance workers. We looked at seven elements of usability that would ease use of a management plan, such as table of contents, page numbering, and floorplans showing sampling locations, homogeneous areas, or ACBM. None of these elements is required by AHERA.

None of the plans contained all seven elements, and 7 percent contained no elements of usability. Exhibit 3-3 displays the distribution of plans with increasing numbers of usability elements.

The curve begins at 100 percent, indicating the percentage of plans with zero or more elements. The curve drops to 93 percent to reflect the number of plans with one or more elements, and further drops to 76 percent representing the number with two or more elements. The curve ends at 0 percent, reflecting the fact that no plans have all seven elements.

Exhibit 3-3.
Number of usability elements found in management plans



Detractions to Use. Beyond the usability elements, Westat went further to identify the features of plans that detracted from their use. Examples are an unclear inspection report, failure to use AHERA categories when assessing ACBM, failure to explain standard forms, and lack of floorplans. In total, 69 percent (± 9%) of the plans had one or more features that detracted from their ease of use.

Correct Use of Terms. Westat further found that plans often used four AHERA-defined terms incorrectly. These terms are "homogeneous area", "functional space", "exclusion", and "random sampling". For these four critical terms, 37 percent (± 9%) of the schools used all four correctly, 46 percent used no more than three correctly, and 12 percent used only two correctly. Five percent used one or none correctly.

Ease of Plan Interpretation. With regard to ease of reading and understanding the plans, we found that 39 percent (± 5%) of plans were readily interpretable only by persons who had some college coursework; 22 percent (± 6%) required that the reader had specialized instruction in the use of the plan. Only 39 percent (± 6%) of plans could be readily interpreted by those with a high-school education or less. Of those people who should be expected to understand plans better -- school principals and custodial workers -- a sound background in AHERA inspections appeared more helpful than knowledge of the building being reviewed.

4. RESPONSE ACTION EVALUATION

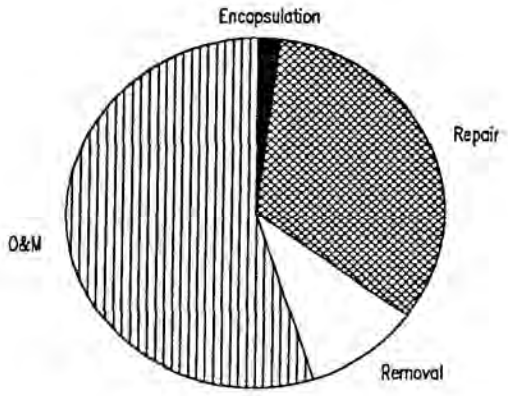
- *What response actions were recommended in the management plan?*
- *Are they appropriate, given the assessed condition of the asbestos?*
- *Have the remediations undertaken in the school been done properly?*

This Research Area is divided in three sections corresponding to the above questions. First, Westat analyzed the presence and type of response actions included in management plans. Second, experts evaluated whether the recommended responses quoted in the plans were appropriate for the type and severity of the problem as identified by the original AHERA inspection. Third, on-site inspectors evaluated whether the actions taken (i.e., "remedia-tions" taken) were done properly. The first two questions study response actions which included repair, encapsulation, enclosure, removal, and the implementation of an Operations and Maintenance (O&M) Plan. By contrast, the third question concerns only remediations, defined as repair, encapsulation, enclosure, and removal. Remediation does not include O&M.

Presence and Type of Response Actions in Plans. Seventy-one percent (± 6%) of the plans in our survey included recommendations for response actions. That is, response actions were included in plans of 126,282 of the estimated 179,093 school buildings with asbestos-containing building materials (ACBM). As shown in Exhibit 4-1, recognizing that each plan could contain multiple recommendations, we found that 55 percent (± 7%) of the recommendations called for handling problems through regular Operations and Maintenance techniques; 33 percent (± 8%) called for repair of the damaged areas; 10 percent (± 2%) called for removal of materials; and 2 percent (± 4%) recommended encapsulation.

The distribution of recommended response actions varied with the type of ACBM. For example, repair of damaged materials was recommended for 56 percent (± 5%) of the occurrences of thermal system insulation. In contrast, Operations and Maintenance was recommended for miscellaneous materials in 93 percent (± 4%) of the cases.

Exhibit 4-1.
Recommended response actions



These results all pertain to the 71 percent of the schools with ACBM whose plans include some recommended actions. Of concern are the plans in the 29 percent (± 18%) of the schools which had no recommended actions despite the documented presence of ACBM. In almost all cases these schools had reported having miscellaneous ACBM; in a few cases the asbestos was surfacing and/or TSI.

Appropriateness of Response Actions Recommended. Ninety-eight percent (± 1%) of recommended response actions were appropriate, that is, they were in accordance with AHERA, given the reported condition of the material. Examples of appropriate response actions are the recommendations of repair for damaged TSI, encapsulation of a damaged area of acoustical ceiling, and removal of asbestos-containing ceiling tiles. Examples of inappropriate response actions are recommendations of O&M for damaged pipe insulation or significantly damaged floor tile.

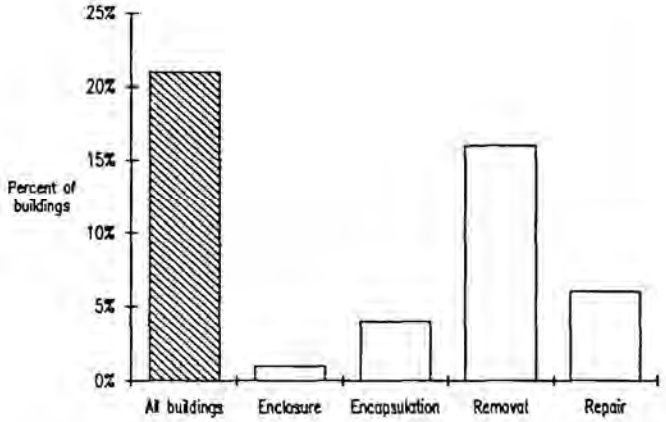
The finding that nearly all recommended response actions were appropriate must be tempered, though, by the observation that many of these recommendations (80%) were generic and failed to specify the locations where the response action should be performed. Response actions were considered generic if, for example, they recommended removal of all damaged material without indicating its locations. Examples of generic recommendations are "repair damaged pipe elbow insulation" or "enclose or encapsulate damaged ceiling tile," where the location of the material is not specified. Generic recommendations provide much less useful guidance to the school than specific recommendations.

A similar picture emerged when we computed our findings based on the number of buildings with ACBM instead of the number of recommendations. Ninety-eight percent (± 1%) of the buildings had appropriate response actions recommended, and 70 percent (± 9%) of the buildings had generic recommendations.

Evaluation of Remediations Conducted. An estimated 246,260 **remediations** were performed in approximately 36,390 school buildings, through Spring 1990. This represents 21 percent of the nation's school buildings with ACBM.[1] As shown in Exhibit 4-2, 16 percent of the nation's school buildings have had one or more removals of ACBM, while 6 percent have had some ACBM repaired, and fewer have had encapsulation or enclosure. Ninety-two percent (± 7%) of the remediations that were visually evaluated were judged to be adequate.

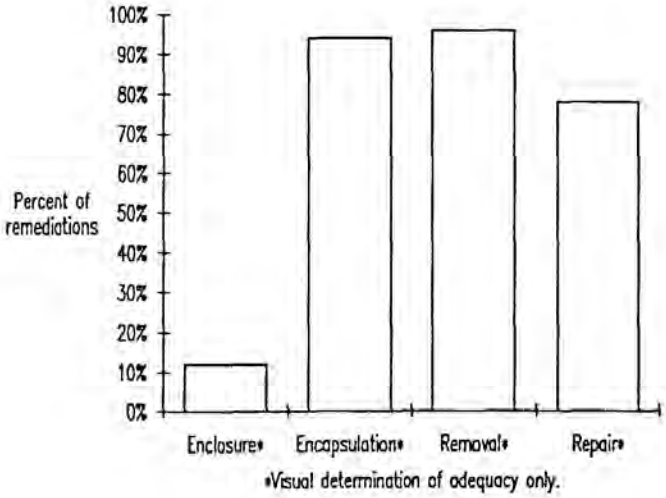
[1]Remediation includes enclosure, encapsulation, removal, and repair and does not include Operations and Maintenance.

Exhibit 4-2.
Percent of school buildings with 1 or more remediations



However, Exhibit 4-3 shows that only 12 percent (± 12%) of the 4,376 performed enclosures were adequate. When "buildings" is the unit of analysis, inadequate remediations were found in 17 percent of school buildings where we were able to visually evaluate remediation efforts.

Exhibit 4-3.
Adequacy of remediations



Many methodological issues were encountered in the evaluation process. Foremost, the remediations studied occurred up to two and one-half years ago. Only the results of each remediation, and not the process, could be evaluated. Second, there are no industry-wide procedures or guidelines for assessing remediations. Even though guidelines were developed for this study, our trained inspectors were frequently asked to make judgments in the field. Finally, this study categorized remediations in four categories -- enclosure, encapsulation, removal, and repair. There are few industry-wide definitions of these terms, and they are not mutually exclusive.

5. ORIGINAL AHERA INSPECTION EVALUATION

- *Given the quality of the original AHERA inspection, as shown by a comparison between the reinspection findings and the findings presented in the management plan, what is the importance of the original AHERA inspector's training, experience, and background in inspection quality?*

This Research Area required a comparison of the reinspection findings and the findings presented in the management plan. Westat performed this comparison by assigning each inspection a rating using a scoring system developed by the EPA and the research team in consultation with our technical consultants. The original AHERA inspectors were then interviewed by telephone to gather information about their education, experience, and background. Where more than one inspector performed the original AHERA inspection, only the most senior inspector was interviewed. Statistical analyses of the relationship between the inspection scores and the inspectors' backgrounds were conducted.

We found no statistically significant associations between any measured characteristic (e.g., education) of the inspectors and the inspection scores. We suspect that this negative finding occurred because all of our information on the original AHERA inspections was obtained from reviews of the management plans. Many inspection companies use standard inspection forms and pre-programmed management plan outlines and shells. These standard forms and the outlines tend to cancel out much of the variation among individual inspectors which, in turn, negates the effects of their backgrounds.

As shown below, sub-elements of this comparison -- the ratings found for the AHERA inspections and the assessment of inspectors backgrounds -- were interesting in their own right.

The inspection scoring system developed for this Research Area identified six factors to measure dimensions of the quality of the inspection and rated each material found using these criteria. Each suspect **material** in a school building was scored on a scale from 0 to 40 according to the original AHERA inspector's performance on these six components. The percentage following each factor represents the frequency with which each criterion was met.

The items are listed in descending order of importance.

- Was the suspect homogeneous material identified? (70%, ± 5%))
- Was the material assessed appropriately? (67%, ± 4%)
- Did the inspector identify at least 80 percent of the areas in the school with the material? (42%, ± 7%)
- Was at least 80 percent of the material quantified? (41%, ± 8%)
- Were the correct number of bulk samples taken? (68%, ± 5%)
- Were the AHERA designated assessment categories used appropriately? (31%, ± 6%)

These findings are consistent with those in Chapter 2 where we reported that 70 percent of all homogeneous suspect materials was identified by the original AHERA inspectors. Once a material was identified, nearly all inspectors assessed it appropriately and took the correct number of bulk samples. Approximately 60 percent of materials was adequately located and quantified.

The material scores were then averaged to obtain a **school average inspection score**. The percentage of inspections in each score category is listed below.

16% Thorough inspection

On average, 16 percent (± 5%) of inspections satisfied the four most important components, but may have failed on one or both of the other two components.

46% Some deficiencies

On average, 46 percent (± 10%) of inspections satisfied the two most important factors, but failed either to accurately quantify the material or to adequately locate it.

17% Deficient

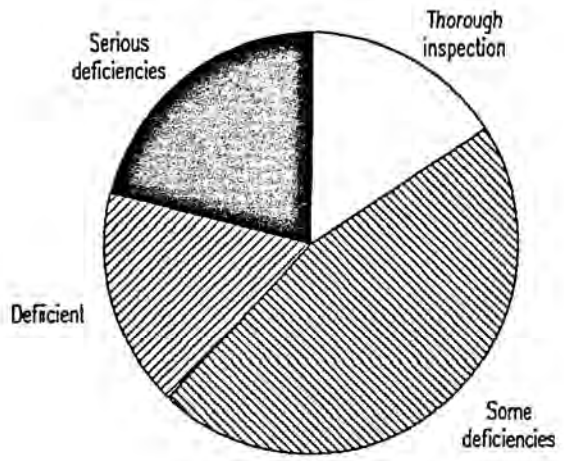
On average, 17 percent (± 6%) of inspections satisfied the two most important factors, but neither accurately quantified the material nor adequately located it.

21% Serious deficiencies

On average, 21 percent (± 6%) of inspections failed to identify the material or assess it appropriately. Inspections may have also failed to adequately quantify or locate the material.

Exhibit 5-1 displays the average scores graphically.

Exhibit 5-1.
School Average Inspection Scores



The primary causes of deficient inspections were failure to identify all suspect material in a school, to record the locations of the ACBM, or to quantify it within acceptable standards of accuracy. The percentage of "thorough inspections" declines as the number of materials increases, from 29 percent (± 12%) in schools with one to five materials, to 8 percent (± 8%) in schools with nine or more materials. Similarly, the percentage of "seriously deficient" scores increases as the number of materials increases.

The methodology used to create average inspection scores balanced competing concerns. The system began with a score applied to each homogeneous suspect material identified in the reinspection. Extreme care was taken to account for differences in inspection terminology, protocol, and reporting format. To allow some leeway, credit was given if the original AHERA inspection reported a material present in at least 80 percent of the areas in which the reinspection found the material. Likewise, credit was given if the original AHERA inspection reported a total quantity of a specific material which was within 20 percent of the quantity found by the reinspection. Finally, the scoring procedure gave full credit to the original inspection when asbestos materials had been totally removed or otherwise abated.

Inspector Experience. All original AHERA inspectors had AHERA accreditation, had conducted asbestos inspections for a median 14 months, and had inspected a median 45 schools. In addition, 65 percent (± 10%) had non-AHERA training in asbestos, 50 percent had finished college, and 46 percent had experience in building trades, environmental occupations, architecture, or engineering. A few inspectors were professional engineers (PE), certified industrial hygienists (CIH), registered architects (RA), or certified safety professionals (CSP).

6. PROCESS OF NOTIFICATION

- *Who has been notified?*
- *Were these people notified through a letter, meeting, article in a school newspaper, or in another way?*
- *After notification occurred, did parents review the management plan, attend meetings to discuss asbestos in the school, or respond to notification with any other action?*
- *What might parent and staff reactions be to differently worded notification letters?*

The goal of this Research Area was to study parent and teacher reactions to notification. Through interviews and focus groups with principals, teachers, and with parents who are active in their school's PTA, the topic of notification was studied with consistent results. In general, while principals recalled notifying parents about the presence of a management plan, parents and teachers often did not recall either being notified or the contents of the notification. Specifically, 50 percent of parents and 23 percent of teachers said they did not receive or remember receiving notification about AHERA. By contrast, 82 percent of principals said that they had sent these notifications. In the schools where school principals did recall notification, 66 percent (± 10%) reported that parents were notified more than once. However, of those who remembered being notified, teachers in 62 percent (± 8%) of schools and parents in 51 percent (± 8%) of schools recalled being notified more than once.

Letters were the most common notification method. For those who recalled being notified, there were some serious differences in principals' and parents' recall of the presence of various important elements in the notifications. While 84 percent (± 7%) of principals recalled notifying parents of the availability of a management plan, parents recalled that only 27 percent (± 7%) of schools sent this information.

In the focus groups, Westat learned that both parents and teachers believe letters are the most effective method of notification, particularly if mailed rather than hand-delivered to parents by students.

Both the survey and the focus groups showed that **parent reactions to notification** tended to be slight. According to the survey, parents in less than 20 percent of schools reacted to notification in any way. In the focus groups, almost no one recalled reacting to notification, and only a handful of participants predicted that they would react to any of the model notifications presented to them. Among those who did react or predicted that they would react, both in the survey and focus groups, the range of actions was very small. They included only such activities as reviewing the management plan, calling the ADP for additional information or, at the most severe, requesting that a discussion of asbestos be added to a meeting agenda.

Through the use of focus groups, Westat also explored preferences for types of notification. Both parents and teachers were eager for a more thorough level of notification than they had experienced to date. Specifically, they wanted a school-based notification mailed to each parent. They wanted this letter to contain the name and telephone number of the ADP (or other school representative such as the principal), a description of any planned response actions and the associated timetable, and brief but informative health risk information.

7. MAINTENANCE & CUSTODIAL WORKER TRAINING AND EXPERIENCE

- *Are maintenance and custodial workers trained to work with and around asbestos?*
- *What topics were included in this training?*
- *What tasks relative to asbestos or suspect ACBM are regularly required of maintenance and custodial workers, and do these tasks correspond to the level of training received?*

This Research Area assessed the level of training and types of work responsibilities of maintenance and custodial personnel. Two different research methods were used: in-person interviews with AHERA designated persons and a qualitative data collection effort. The qualitative effort consisted of focus group interviews in five locations with maintenance workers and custodians from schools where asbestos was present. In each group there was a mix of maintenance workers and custodians who worked in various types of schools.

Maintenance workers, by definition, are responsible for repair and upkeep of systems such as plumbing, heating ventilation, and air conditioning. Custodians by definition are responsible for janitorial jobs and, in some cases, minor maintenance such as changing light bulbs. AHERA requires all members of a school's maintenance and custodial staff who may work in a building that contains ACBM to receive awareness training of at least two hours, whether or not they are required to work with ACBM. Moreover, AHERA requires that all staff who conduct any activities that will result in the disturbance of ACBM receive 14 hours of additional training beyond that required for awareness (a total of 16 hours).

Even though a person is classified as a maintenance worker, he or she may not perform the traditional maintenance worker activities. Conversely, custodians in some schools perform more traditional maintenance worker activities.

Training of Maintenance and Custodial Workers

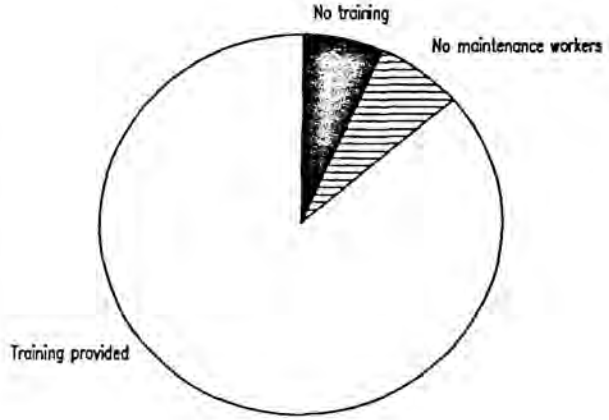
The first question in this Research Area considered training of maintenance and custodial workers. The issues were addressed through an in-person survey of the ADP from each sampled school and through focus groups with maintenance and custodial workers.

Survey Results. The survey results presented for this Research Area are based on the estimated 83,840 schools nationally that performed an AHERA inspection, found asbestos-containing materials, and wrote a management plan.

The level of training reported by the ADPs may not reflect that actually received by maintenance workers and custodians. The ADPs may be motivated to overreport the number of training courses to show a greater level of compliance with the AHERA regulation than actually occurred. Also, there may be a difference between the percentage of schools that offer training and the percentage of maintenance workers and custodians actually trained (e.g., due to absenteeism, not all maintenance workers or custodians in a school will be trained through any given course).

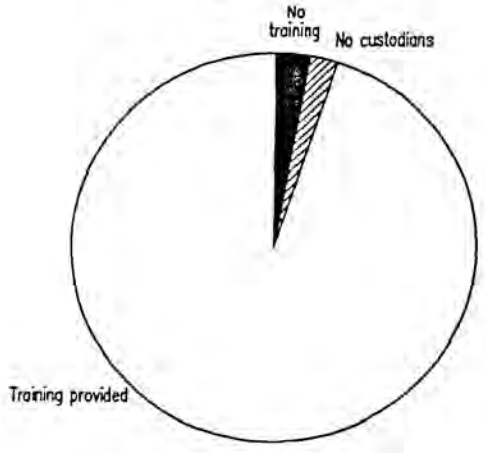
In general, ADPs reported that the length of training received by maintenance workers was somewhat below that required by AHERA for workers who work directly with ACBM. Specifically, 87 percent (± 9%) of schools provided asbestos-related training to maintenance workers in the post-AHERA period, while 7 percent (± 5%) offered no training, and 7 percent (± 6%) of schools did not have this type of employee (see Exhibit 7-1).

Exhibit 7-1.
Percent of schools providing some training to maintenance workers



Training for custodial workers was not statistically different than that for maintenance workers. Ninety-five percent (± 6%) of schools had conducted training classes that met the AHERA requirement for awareness training for custodial workers since October 1987 (Exhibit 7-2). Three percent offered no training, and 2 percent of schools did not hire any custodians.

Exhibit 7-2.
Percent of schools providing some training to custodians



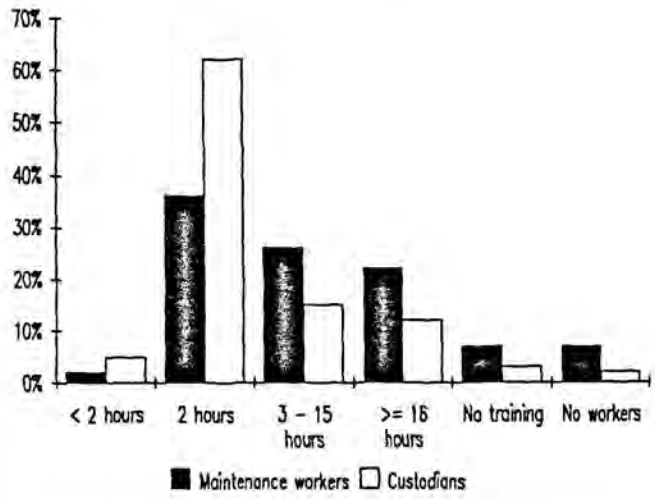
Schools that did not provide training may not employ staff requiring training under AHERA. For instance, if a worker's responsibilities do not require work in a building with ACBM, he or she may not require training. Statistical information about worker responsibilities cannot be learned from the AHERA evaluation.

A closer look at the training of maintenance and custodial workers employed by the school district shows that 85 percent (± 10%) of schools have conducted both maintenance worker and custodial training since October 1987. Three percent (± 3%) of schools have not trained either their maintenance or custodial workers at all.

The duration of training received by custodians and maintenance workers varied. Twenty-two percent (± 5%) of schools that trained their maintenance workers provided 16 or more hours of training. AHERA requires 16 hours of training for staff with traditional maintenance worker responsibilities in schools in which asbestos-containing materials were found. Workers not required to work in any buildings with ACBM could require less than the 16-hour training mandated by AHERA.

Eighty-nine percent (± 5%) of schools trained custodians two hours or longer or, stated differently, nine out of ten schools' custodial training courses are in compliance with the AHERA guidelines for the length of awareness training required for workers who do not come into contact with ACBM. Exhibit 7-3 shows that five percent (± 6%) of the courses were under two hours, indicating that a small percentage of schools does not meet the minimum length requirement for AHERA awareness training. On the other hand, 12 percent (± 8%) of custodians received a 16-hour training, indicating the school's awareness that some custodial workers do come into direct contact with ACBM.

Exhibit 7-3.
Percent of schools providing various lengths of training to maintenance and custodial workers



Maintenance and Custodial Worker Focus Group Results. A majority of the maintenance workers who participated in the focus groups reported receiving at least the AHERA-required hours of training, given their specific job responsibilities. However, there were workers who work with and potentially disturb ACBM and received only an awareness training. These workers' training did not meet AHERA requirements relative to their job responsibilities. In addition, there were few maintenance workers who received no training at all, but were simply told not to work near asbestos. Since these workers reported working in buildings with ACBM, they should have received an awareness course at a minimum.

Most custodians reported receiving two to four hours of training since October 1987 and thus met or exceeded the required level of awareness training. However, many custodians also reported disturbing ACBM and said they had not received the AHERA-required 16-hour minimum training.

Curriculum of Training

The second question in this Research Area considered training curriculum and was addressed through in-person interviews with ADPs and focus group discussions with maintenance and custodial workers. Survey results are presented for schools that employ their own maintenance and custodial workers.

Survey Results. This study examined course content from the perspective of whether training included a description of the locations of ACBM. Up to 25 percent (± 8%) of schools did not include such a description for their maintenance workers. Moreover, 18 percent (± 7%) of the schools did not describe the locations of ACBM to their custodians.

Of the courses that did provide location description, three methods stand out. The most common method of presentation was through a verbal description of the locations of ACBM in the school. Ninety-two percent (± 4%) of the schools used this method in training maintenance workers, while 91 percent used it for training custodians (± 5%). The second most common method was presenting the floorplan of the building [81% (± 10%) for maintenance workers and 75% (± 11%) for custodians]. Third, approximately half of the schools provided a walkthrough to both types of workers. These methods do not total 100 percent as schools often used more than one training method.

Maintenance and Custodial Worker Focus Group Results. Many maintenance workers and custodians reported course content as consistently containing similar items. Maintenance workers who received 16 hours of training were told about the health effects of asbestos and were presented the standard information for an awareness course. Most were shown some safety procedures to follow when working around asbestos. Whenever films, videos, or slides were used, a knowledgeable person was present to answer questions. In a few situations the workers recalled that the location of ACBM was discussed during the training.

Based on discussion in the focus groups, it appears that the curriculum meets the requirements outlined by AHERA, though the lack of knowledge about specific locations of ACBM suggests that it may be inadequate for promoting good work practices.

Many of the participants stated that they did not believe they retained much of the training information.

Approximately half the maintenance workers received training on respirator use, learning how to perform positive and negative pressure testing. However, none of these people were fit-tested by the Occupational Health and Safety Administration (OSHA) definition of the term, and virtually none met OSHA's medical examination and other requirements for respirator use. No custodians, whatever their responsibilities around ACBM, reported receiving respirator training or having access to a respirator.

Tasks Required of Maintenance and Custodial Workers

The third question in this Research Area considered the tasks relative to asbestos or suspect ACBM regularly required of maintenance and custodial personnel, and whether tasks corresponded to the level of training received. This topic was addressed solely through focus group discussions with maintenance and custodial personnel.

Maintenance and Custodial Personnel Focus Group Results. Although the length of training appears adequate for both types of workers, the focus group findings show that frequent unprotected and inappropriate work practices are used in schools in the five communities in which focus groups were held. On the whole, these inappropriate work practices were performed while cleaning up fiber release episodes of less than three linear or square feet, or as routine maintenance/custodial activities. Because the workers were unaware that a material might contain asbestos, because of inadequate or no training, or because of pressure to act immediately in an "emergency" situation (such as a leaking roof), it is almost certain that exposure to asbestos occurs and that appropriate procedures are followed in only a few cases. Most workers did not express concern that they might disturb asbestos and create a health hazard when they removed suspended ceiling tiles or brushed against insulated pipes. ACBM was seen as being disturbed only when it was sawed, cut, or in some other way visibly damaged.

Many maintenance and custodial workers reported being concerned about the security of their jobs if they "say anything about asbestos" or take the time to follow appropriate working practices around asbestos. Only one maintenance worker claimed to have faced the loss of his job over asbestos issues, though other workers expressed concern for job security.

8. GLOSSARY

ACBM: Asbestos-containing building material is surfacing ACM, thermal system insulation ACM, or miscellaneous ACM that is found in or on interior structural members or other parts of a building.

ACM: Asbestos-containing material is, when referring to school buildings, any material which contains more than one percent asbestos.

Activity Plans: Written procedures in a school's management plan which detail the steps an LEA will follow in performing the initial and additional cleaning, operations and maintenance program tasks, periodic surveillance, and reinspections required by AHERA.

AHERA Designated Person (ADP): A person designated by the Local Education Agency to ensure that the AHERA requirements are properly implemented.

Assessment (1-7): Evaluation of the physical condition and potential for damage of all friable ACM and thermal system ACM. AHERA requires classification of each ACBM assessed into one of seven categories based on material type and damage/potential for damage.

Bulk Sample: A small portion (usually about thumbnail size) of a suspect asbestos-containing building material collected by the asbestos inspector for laboratory analysis to determine asbestos content.

Encapsulation: The treatment of asbestos-containing material (ACM) with a liquid that covers the surface with a protective coating or embeds fibers in an adhesive matrix to prevent the release of asbestos fibers.

Enclosure: An airtight, impermeable, permanent barrier around asbestos-containing material to prevent the release of fibers.

Exclusion: One of several situations which permit a LEA to delete one or more of the items required by AHERA, e.g. records of previous sample collection and analysis may be used by the accredited inspector in lieu of AHERA bulk sampling.

Friable: Material that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Functional Space: Under AHERA, a room, group of rooms, or homogeneous area designated by a person accredited to prepare management plans, design abatement projects, or conduct response actions.

Homogeneous Area: In accordance with AHERA definitions, an area of surfacing material, TSI, or miscellaneous material that is uniform in color and texture.

Local Education Agency (LEA): An educational agency at the local level that exists primarily to operate schools or to contract for educational services. This includes primary and secondary public and private schools.

Management Plan: A document that each Local Education Agency is required to prepare under AHERA regulations. This document describes all activities planned and undertaken by a school to comply with AHERA regulations, including: building inspections to identify asbestos-containing materials, response actions, and operations and maintenance programs to minimize the risk of exposure to asbestos in school buildings.

Material Category: Broad classification of suspect materials into TSI, surfacing material, and miscellaneous material.

Material Type: Classification of suspect material by its specific use or application, e.g., pipe insulation, fireproofing, and floor tile.

Miscellaneous Material: Interior building material on structural components, such as floor or ceiling tiles. Does not include TSI or surfacing material.

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

Original AHERA Inspection/Original Inspection/Inspection: Examination of school buildings arranged by Local Education Agency, pursuant to AHERA, to identify asbestos-containing materials, evaluate the condition of those materials, and take samples of materials suspected to contain asbestos. Inspections are to be performed by inspectors accredited by the EPA.

OSHA: Occupational Safety and Health Administration.

PSU: Primary Sampling Unit, a geographic area, usually a county or group of counties, defined by the Census Bureau for survey sampling purposes.

Random Sample: Method of collecting bulk samples of asbestos that assures statistical randomness.

Reinspection: The examination of homogeneous materials in which an original AHERA inspection has been performed previously. For this study, reinspections were performed without knowledge of the results of the original AHERA inspection.

Remediation: For the AHERA evaluation, repair, encapsulation, enclosure, or removal of greater than 3 linear feet or square feet of ACBM.

Removal: The taking out or stripping of ACBM from an area, a functional space, or a homogeneous area.

Repair: Procedures used to patch or cover damaged asbestos-containing materials other than enclosure or encapsulation. Examples include covering the damage with plastic sheeting, duct tape, or plaster.

Response Actions: Any of the following actions taken in school buildings in response to AHERA, to reduce the risk of exposure to asbestos in school buildings: removal, encapsulation, enclosure, repair, and Operations and Maintenance.

Surfacing Material: Material sprayed or troweled onto structural members (beams, columns or decking) for fire protection; or on ceilings or walls for fireproofing, acoustical or decorative purposes. Includes fireproofing, textured plaster, and other textured wall and ceiling surfaces.

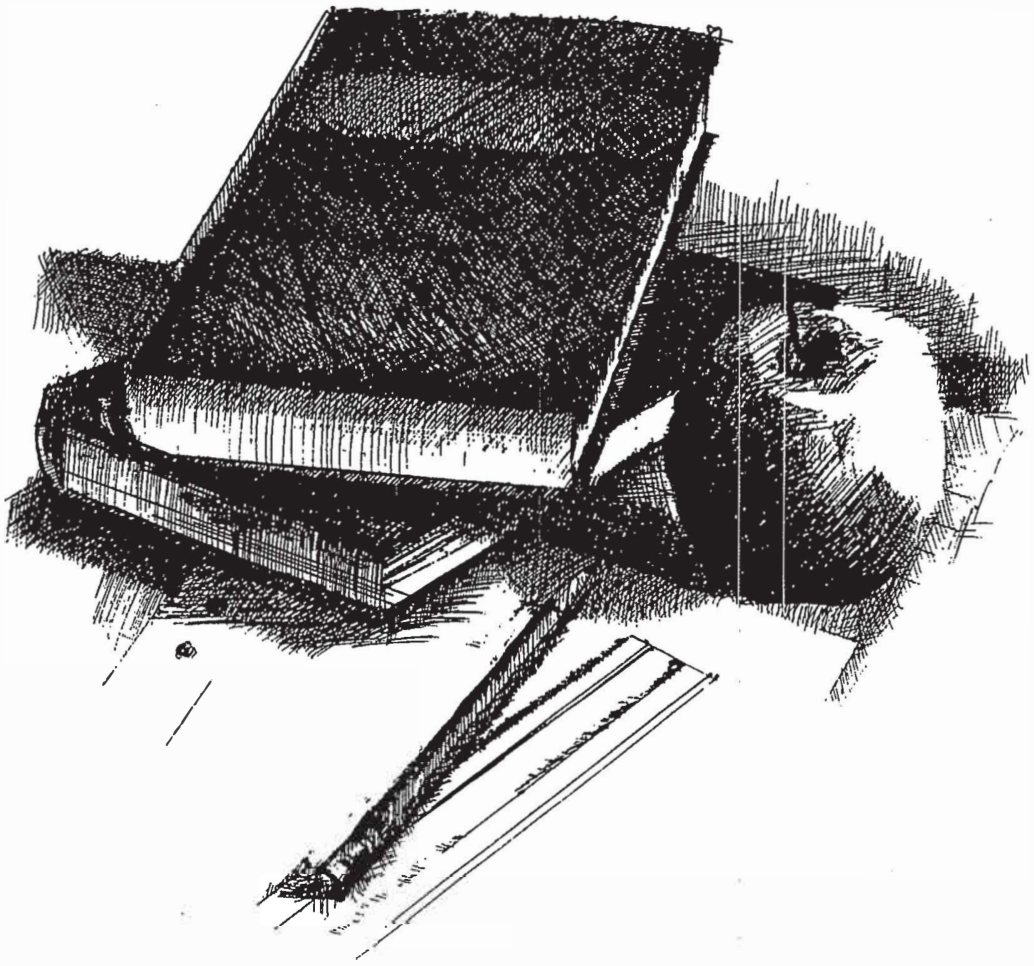
Suspect Material: Building material suspected of containing asbestos because of past practices in its manufacture and use; includes surfacing material, floor tile, ceiling tile, thermal system insulation, and miscellaneous other materials. Suspect materials are classified as ACM or non-ACM by analyzing bulk samples to determine asbestos content.

TSI: Thermal System Insulation; i.e., insulation applied to steam and hot and cold water systems and HVAC systems to prevent heat transfer and water condensation. Includes pipe insulation; pipe joint, valve, fitting and elbow insulation; and insulation applied to boilers, water tanks, compressors, air-handling equipment, radiators, ducts, etc.

United States Environmental Protection Agency
Office of Pesticides and Toxic Substances
July 1991

EPA

Asbestos in Schools: Evaluation of the Asbestos Hazard Emergency Response Act (AHERA): A Fact Sheet



Printed on Recycled Paper

United States
Environmental Protection
Agency

Office of Pollution
Prevention and Toxics
Washington, D.C. 20460

EPA 700/B-92/001
FEBRUARY 1992

EPA

A GUIDE TO PERFORMING REINSPECTIONS UNDER THE ASBESTOS HAZARD EMERGENCY RESPONSE ACT (AHERA)



Printed on Recycled Paper

A GUIDE TO PERFORMING REINSPECTIONS

UNDER THE ASBESTOS HAZARD EMERGENCY

RESPONSE ACT (AHERA)

U.S. Environmental Protection Agency
Office of Pollution Prevention and Toxics
Environmental Assistance Division

U.S. Environmental Protection Agency
Region 5, Library (PL-12J)
77 West Jackson Boulevard, 12th Floor
Chicago, IL 60604-3590

February 1992

ACKNOWLEDGEMENTS

The Environmental Protection Agency (EPA) would like to take this opportunity to acknowledge a number of individual contributors from inside and outside EPA that strengthened the development of this guidance document. The individuals identified below contributed immensely to this publication, therefore ensuring that school districts, inspectors, management planners, and training providers receive the foremost technical guidance available.

The EPA project coordinator for development of this guidance document was **Betty Weiner**, from the Environmental Assistance Division. Betty's diligence and perseverance led to the successful development of this manual.

To assist in the preparation of this document, EPA entered into a contractual agreement with WESTAT, Inc. of Rockville, Maryland. The following individuals associated with WESTAT, Inc. were instrumental in the unfolding of this document:

Susan Marie Viet, CIH
Alexa Fraser, Ph.D.
Dale L. Keyes, Ph.D.

EPA Regional Staff

James Bryson - U.S. EPA Region I
Louis Bevilacqua - U.S. EPA Region II
Al Kramer - U.S. EPA Region II
Carole Dougherty - U.S. EPA Region III
Rhonda Evans - U.S. EPA Region IV
Terrence Stanuch - U.S. EPA Region V
Steve Vargo - U.S. EPA Region VI
Wolfgang Brandner - U.S. EPA Region VII
Greg Crable - U.S. EPA Region VII
David Combs - U.S. EPA Region VIII
Jo Ann Semones - U.S. EPA Region IX
Matt Wilkening - U.S. EPA Region X

EPA Headquarters Staff

Tom Ripp - Stationary Source Compliance Division
Mary Jane Angelo - Office of General Counsel, Pesticides and Toxic Substances Div.
Cindy Fournier - Pesticides and Toxics Enforcement Division
Sally Sasnett - Office of Compliance Monitoring
Sanda Howland - Office of Compliance Monitoring

Environmental Assistance Division

Dave Kling
Bob McNally
Gina Bushong
Joe Schechter
Phil King
Bob Jordan
Diane Sheridan

Other Federal and Outside Organizations

National Association of Independent Schools - James T. Kaull
Council for American Private Education - Greg D. Kubiak
The National Association of Elementary School Principals - Ed Keller
The Council of the Great City Schools - Michael Casserly
American Association of School Administrators - Joyce Hill
U.S. Catholic Conference - Rev. William F. Davis
National Education Association - Joel Packer
National Parent Teacher Association - Carolyn Henrich
Department of Defense Stateside Dependents Schools - Dr. Hector O. Nevarez
Occupational Safety and Health Administration - Dr. Carol J. Jones

TABLE OF CONTENTS

Chapter			Page
1	**INTRODUCTION**		1-1
	1.1	The Purpose of this Guide	1-1
	1.2	Time Periods for Reinspections	1-2
	1.3	Terminology Used in this Guide	1-3
	1.4	Summary of Relevant AHERA Evaluation Study Reinspection Findings	1-4
2	**AHERA DESIGNATED PERSON'S REINSPECTION PLANNING RESPONSIBILITIES**		2-1
3	**INSPECTOR'S REINSPECTION RESPONSIBILITIES**		3-1
4	**MANAGEMENT PLANNER'S REINSPECTION RESPONSIBILITIES**		4-1
5	**AHERA DESIGNATED PERSON'S RECORDKEEPING RESPONSIBILITIES**		5-1

List of Appendices

Appendix		Page
A	AHERA Regulatory Citations for Reinspections	A-1
B	Sample Reinspection Form 1: Original AHERA Inspection Information Abstracted from the Management Plan and Instructions for Using Reinspection Form 1	B-1
C	Sample Reinspection Form: Reinspection of ACBM: Findings and Management Planner Recommendations and Instructions for Using Reinspection Form 2.	C-1

TABLE OF CONTENTS (continued)

List of Appendices (continued)

Appendix		Page
D	Answers to the Most Frequently Asked Questions About Reinspections Under the AHERA Asbestos-in-Schools Rule	D-1
E	Glossary of Terms	E-1
F	References	F-1
G	Pull-out copies of:	
	1. Sample Reinspection Form 1: Original AHERA Inspection Information Abstracted from the Management Plan	G-2
	2. Sample Reinspection Form 2: Reinspection of ACBM: Findings and Management Planner Recommendations	G-3
	3. Recommended Reinspection Checklist for the AHERA Designated Person-Planning for the Reinspection	G-4
	4. Recommended Reinspection Checklist for the Inspector	G-5
	5. Recommended Reinspection Checklist for the Management Planner	G-8
	6. Recommended Reinspection Checklist for the AHERA Designated Person-Recordkeeping	G-9
	7. Recommended Sample Reinspection Notification Letter	G-10
H	Message from the Administrator of EPA	H-1
I	Points of Contact The Regional Asbestos Coordinators and the State AHERA Designees	I-1

TABLE OF CONTENTS (continued)

List of Exhibits

Exhibit		Page
A	Recommended Reinspection Checklist for the AHERA Designated Person - Planning for the Reinspection	2-2
B	Recommended Reinspection Checklist for the Inspector	3-2
C	Recommended Reinspection Checklist for the Management Planner	4-2
D	Recommended Reinspection Checklist for the AHERA Designated Person - Recordkeeping	5-2
E	Recommended Sample Reinspection Notification Letter	5-4

CHAPTER 1. INTRODUCTION

1.1 The Purpose of This Guide

Under the Asbestos Hazard Emergency Response Act (AHERA)[1], the United States Environmental Protection Agency (EPA) requires each elementary and secondary school to perform an inspection for asbestos-containing building material (ACBM) and to prepare an asbestos management plan. The AHERA regulations further require a reinspection of the ACBM at least once every 3 years.

This reinspection guide will assist:

- Local Education Agencies (LEAs),
- AHERA designated persons,
- Asbestos inspectors, and
- Management planners

in meeting the specific requirements for an AHERA reinspection. Further, it provides guidance for improving the accuracy and quality of information available about ACBM during the reinspection.

The reinspection period provides an excellent opportunity for schools to re-evaluate and update their programs for managing asbestos. EPA recently issued general guidelines for asbestos in buildings in an advisory letter from the EPA Administrator which was sent to all LEAs. The letter summarizes EPA's policies for asbestos control in schools and other buildings in the form of "Five Facts." This letter is presented in Appendix H.

This guide addresses only the Federal requirements for reinspections. A school may also be subject to State or local requirements not discussed here. The Regional Asbestos Coordinators and the State AHERA designees are both listed at the end of Appendix I. These individuals can provide more specific information about local regulations, and information on how to obtain further training and assistance.

---

[1] 40CFR763, *Asbestos-Containing Materials in Schools: Final Rule and Notice*, U.S. Environmental Protection Agency, October 1987.

1.2 Time Periods for Reinspections

The AHERA regulation states that schools must perform reinspections at least once every 3 years after the management plan is implemented. It also required management plans be implemented by July 9, 1989. Therefore, LEAs must complete the first round of reinspections on or before July 9, 1992. If a management plan was implemented before July 9, 1989, the LEA must complete its reinspection within 3 years of the earlier date. Additional questions concerning the AHERA requirements for reinspections are answered in the EPA publication, **Answers to the Most Frequently Asked Questions about Reinspections**. A copy of this publication is in Appendix D.

Example 1. The LEA implements the school's management plan on January 30, 1989.

- The first reinspection must be completed by January 30, 1992,
- The second reinspection must be completed by January 30, 1995, and so forth.

The LEA must submit management plans to the State Governor's office for buildings brought into service after October 12, 1988, prior to their use as a school building. The AHERA regulation also requires reinspection of these buildings at least every 3 years from the date of management plan implementation.

Example 2. The LEA begins to use a building as a school building on September 3, 1991. The LEA performs the original inspection and submits the management plan to the State Governor, as required, on August 30, 1991. Upon expiration of the 90-day period for State review, the plan is implemented on November 30, 1991 (unless the plan has been disapproved by the state).

- The first reinspection for this building must be completed by November 30, 1994.

Example 3. The school implements its management plan on July 9, 1989. The school takes the building out of service as a school building on January 1, 1992.

- If the school returns the building to service on June 1, 1992, the reinspection must be completed by July 9, 1992, within the original 3 year reinspection period.

- If the school returns the building to service on September 1, 1992, the reinspection must be completed by October 1, 1992, within 30 days after commencement of use, for whatever reason.

Note: If the school had not retained the original management plan and inspection reports when the building was taken out of service, a complete original AHERA inspection must be performed (including bulk sample collection), and a new management plan must be developed prior to using the building as a school building again. (See Example 2 above.)

Reinspections are considered complete after four steps occur. These are (1) inspector's completion of the visual examination and assessments of ACBM as detailed in 40CFR763.85(b), (2) inspector's submission of the reinspection findings to the designated person within 30 days following the field work, (3) management planner's review of the results of the reinspection, and (4) management planner's submission of recommendations for response actions to the designated person.

1.3 Terminology Used in this Guide

This section presents important terms or concepts that are used throughout the guide. See Appendix E for a glossary of other key terms.

Functional Space versus Room/Area

AHERA regulations define a functional space as "a room, group of rooms, or homogeneous area designated by a management planner, project designer, or person accredited to conduct response actions." The AHERA Preamble refers to functional space as a "term of art" used by the accredited expert to appropriately characterize an area as containing "significantly damaged friable surfacing ACM" or "significantly damaged friable miscellaneous ACM." In the context of response actions, the affected functional space is that area within the containment area.

This indicates that a functional space can be a grouping of areas with similar response action recommendations. The AHERA definition requires that management planners, not inspectors, define functional spaces.

For the discussion in this guide, the term room/area refers to spaces defined by the inspector during the reinspection. The inspector may interpret this as an individual space surrounded by walls, such as a hallway or classroom; a group of individual spaces; or the entire

homogeneous sampling area. We strongly recommend the first interpretation, i.e., an individual space surrounded by walls. This clearly-defined space will enable the LEA, school staff, and parents to easily review information about ACBM for a specific location.

Original Inspection Versus Reinspection

Original inspection or original AHERA inspection refers to the initial inspection (generally performed before July 9, 1989) to meet AHERA requirements.

Reinspection refers to the required reinspection of all ACBM identified during the original AHERA inspection. LEAs must perform reinspections at least once every 3 years.

When we refer to materials that were not identified during the original AHERA inspection and which are found at a later date (possibly as part of the reinspection activity), we use the term inspection since it refers to the first recording of these materials in the management plan.

LEA Versus AHERA Designated Person

The LEA must designate and train a person to ensure that the AHERA regulations are properly implemented. Since this designated person acts on behalf of the LEA, we use the terms LEA and AHERA designated person or designated person interchangeably in this guide.

1.4 Summary of Relevant AHERA Evaluation Study Reinspection Findings

In June, 1991, the EPA released the report entitled **Evaluation of the Asbestos Hazard Emergency Response Act (AHERA).** This report was prepared as part of a commitment to Congress by EPA to evaluate the effectiveness of the AHERA regulation and to determine which elements might be used in future regulation of public and commercial buildings. A summary document entitled **Asbestos in Schools: Evaluation of the Asbestos Hazard Emergency Response Act (AHERA): A Summary Report** presents the Evaluation Study's major findings. The summary document can be obtained by calling the Toxic Substances Control Act (TSCA) Hotline (see Appendix F). The **Evaluation of AHERA: A Fact Sheet**, which was sent to all schools in the summer of 1991, can also be obtained through the hotline.

The evaluation study was based on a national statistical sample of 198 schools in 30 communities. The study focused only on occupied school buildings in the United States with students in any of grades 1 through 12. There were a few exclusions: buildings constructed after October 1988, buildings where the original AHERA inspection found no asbestos, and buildings where no inspection was conducted in response to AHERA. The report estimates that the schools in the target population, from which the sample for this evaluation was drawn, represent approximately 80 percent of the 106,000 schools in the nation.

The evaluation study covered six major areas of the AHERA regulation:

- identification and assessment of material;
- management plan evaluation;
- response action evaluation;
- original AHERA inspection evaluation;
- process of notification; and
- maintenance and custodial worker training and experience.

The following represent the findings of the AHERA Evaluation that pertain to performing reinspections:

- **unidentified materials**

  Many original AHERA inspections did not identify at least one suspect material present. The most consistently unidentified materials were:

  - fire doors
  - duct insulation
  - resilient sheet flooring/linoleum
  - vibration dampening cloth

  The study did not evaluate smooth wall materials [such as gypsum wallboard (also called sheetrock or drywall), joint compound, and hard plaster]. However, the EPA believes original inspections may have frequently missed these materials.

- **material locations**

  Only 56 percent of the areas where ACBM was identified had the exact location recorded in the management plan.

- **material quantity**

  An estimated 89 percent of the total quantity of suspect ACBM reinspected in the evaluation was reported in the original AHERA inspection.

- **material assessments**

  Ninety-two percent of the ACBM that should have been assessed according to AHERA was actually assessed. Forty-four percent of the ACBM assessed used AHERA categories reporting the amount of damage and potential for damage at the time of inspection.

- **management plans**

  Written management plans generally contain all the required information. This information is often difficult to understand, however, without specialized instruction.

CHAPTER 2. AHERA DESIGNATED PERSON'S REINSPECTION PLANNING RESPONSIBILITIES

Exhibit A presents the first of two checklists for the AHERA designated person. He or she must take a number of steps in planning for the reinspection prior to any field activities. Each of these steps is discussed below.

☐ **A1. Select the inspector(s) and management planner to perform reinspection activities; obtain proof of their current accreditations.**

A person's accreditation is current if he or she has successfully completed an EPA or State approved accreditation or refresher course within 1 year prior to the reinspection activity. Similarly, the management planner reviewing the reinspection results must be accredited under AHERA as a management planner and his or her accreditation must be current. While there is an additional 1-year grace period to take the refresher course without having to take the full course over again (total of 2 years since the last accreditation course), an individual is not considered accredited during the second-year period. There are no other restrictions on the inspector or management planner, with the exception of possible conflict of interest (see page 2-3).

The inspector and management planner may be:

- the person(s) who performed the original inspection and/or prepared the management plan, if accreditation is still current. His or her familiarity with the school could increase efficiency and thus save some time and money. On the other hand, these individuals may repeat errors made during the original inspection;

- the AHERA designated person or other LEA employee, if accredited. However, the LEA must ensure that reinspections are performed conscientiously. Someone who works in a building every day may not be attuned to changes in ACBM condition or may fail to identify suspect materials not reported in the original inspection; or

- a consultant or consulting company employee, if accredited.

Request copies of inspector and management planner certificates to verify that accreditations are current. Include these in the management plan.

Exhibit A. Recommended Reinspection Checklist for the AHERA Designated Person-Planning for the Reinspection

☐ 1. Select the inspector(s) and management planner to perform reinspection activities; obtain proof of their current accreditations.

☐ 2. Determine the scope of work.

- ☐ 2a. Clarify which buildings are to be included in the reinspection. Determine whether each building is used as a school building.
- ☐ 2b. Determine whether previously grouped, similar materials (e.g., all floor tile) should be separated into distinct materials.
- ☐ 2c. Determine whether previously assumed ACBM should be bulk sampled. Determine whether other bulk samples should be collected.
- ☐ 2d. Determine whether quantities of ACBM should be re-estimated.
- ☐ 2e. Determine whether the inspector should look for previously unidentified suspect materials. (Highly recommended by the EPA.)

☐ 3. Determine how the reinspection results will be reported.

- ☐ 3a. Determine whether locations of ACBM should be reported on a room-by-room basis, rather than by a building or homogeneous sampling area basis.
- ☐ 3b. Determine whether a floorplan or written description, or both, will be used to locate ACBM.
- ☐ 3c. Determine whether ACBM will be assessed on a room by room, homogeneous sampling area, or some other basis.
- ☐ 3d. Determine whether photographs or videotape will be used to document material condition.

Conflict of Interest

Although any person whose inspector or management planner accreditation is current may perform their respective roles, the LEA should consider whether a conflict of interest exists. This is particularly important where one person or firm may serve two or more roles at the school. For example, a conflict of interest might exist if the management planner and the asbestos contractor both worked for the same firm. The planner might recommend response actions that are more expensive than necessary to protect human health and the environment. A similar conflict of interest might arise if the same person acts as both inspector and management planner for the school.

Reinspection Assistants

Only an accredited inspector may perform required reinspection activities. An unaccredited assistant cannot locate, touch, or assess ACBM or sign reinspection forms. Such an assistant can, however, record information dictated by the inspector, carry supplies, assist in gaining access to areas, and perform other non-regulated tasks.

☐ **A2. Determine the scope of work.**

You may want to expand upon the minimum requirements for a reinspection, as discussed below. Carefully consider the work required before beginning the field work.

☐ **A2a. Clarify which buildings are to be included in the reinspection. Determine whether each building is used as a school building.**

List the buildings to be reinspected. Include any temporary buildings. LEAs must reinspect all buildings or portions of buildings which were originally inspected and which they "lease, own or otherwise use as a school building" [see 40CFR763.85(b)(1)]. Administrative and maintenance buildings, storage areas, garages, utility facilities, and student housing essential to operating the school and under the authority of the LEA must all be reinspected, if they contain friable or nonfriable known or assumed ACBM.

Management plans are to be developed on a "per school" basis. Homogeneous sampling areas are to be identified for each "school building." A "school" may be comprised of numerous "school buildings." Management plans, however, often do not distinguish between buildings on the same campus. In addition, homogeneous sampling areas are sometimes incorrectly defined across several buildings. For example, one homogeneous sampling area may be "2x4 ceiling tile in Buildings 1, 2, and 3." Treat each building individually for reporting and bulk sampling purposes. Review whether these types of errors occur in the reports for buildings scheduled for reinspection, and instruct the inspector to correct any possible deficiencies.

Buildings which may not need reinspection include:

- **Buildings no longer used as school buildings.**

  Buildings do not require a reinspection if they are no longer used as school buildings when a reinspection is scheduled. This is true even if the LEA still owns or leases them. An example is a temporary trailer which is unused due to decreased enrollment.

  It is recommended that the LEA provide a statement in the management plan that the building is not currently used as a school building. If the LEA decides to use the building at a later date, the building must be reinspected (see Section 1.2). Remember, however, that LEA buildings not currently or ever used as classrooms (e.g., storage or administrative buildings) are subject to AHERA.

- **Buildings in which no known or assumed ACBM was reported in the original AHERA inspection.**

  If no known or assumed ACBM was reported during the original inspection, the building does not have to be reinspected. There should be a statement in the management plan that no ACBM was present. Further, no reinspection is required if the management plan contains a signed statement that the building is asbestos-free in accordance with 40CFR763.99(a).

  We recommend, however, that the LEA reinspect each building for materials often not identified in the original inspection. Such materials include fire doors, resilient sheet flooring/linoleum, interior and exterior duct insulation, vibration dampening cloth, and suspect wall materials. It would also be prudent to look for other suspect materials not identified during the original inspection. (See page 2-7, A2e.)

- **Buildings in which all known or assumed ACBM has been removed.**

  In strict accordance with the AHERA regulation, a building does not have to be reinspected if all ACBM has been removed. Include documentation of the removal in the management plan.

  We recommend that the LEA verify that the removal of ACBM has been complete with no debris left behind, and that there are not still suspect materials in the building which were unidentified during the original AHERA inspection.

- **Buildings constructed after October 12, 1988.**

  School buildings built after October 12, 1988 do not require reinspection if an architect or project engineer responsible for the construction of the building, or an accredited inspector, signs a statement that no ACBM was specified in the construction documents or, to the best of the person's knowledge, that ACBM was not used as a building material.

☐ **A2b. Determine whether previously grouped, similar materials (e.g., all floor tile) should be separated into distinct materials.**

Grouping different materials into one homogeneous sampling area was common during the original inspections. Grouped materials were generally assumed to be ACBM. For example, a management plan might describe all floor tile in a building as a single homogeneous area of ACBM, even though there were five colors or various sizes of floor tile. If this practice occurred, it was a misinterpretation of the homogeneous area concept and should be corrected.

Determine whether the original inspector grouped any unlike materials in your building. Decide whether to treat these materials as different homogeneous sampling areas based on distinguishing factors, such as texture, color, or location. By breaking these groups into their individual materials, a significant quantity of material might be reclassified as non-ACBM (based on results of laboratory analysis).

☐ **A2c. Determine whether previously assumed ACBM should be bulk sampled. Determine whether other bulk samples should be collected.**

There are two choices in dealing with previously assumed ACBM during a reinspection:

(1) continue to assume the material is ACBM, or

(2) collect bulk samples for laboratory analyses, in which case the material can be reclassified as either known ACBM or non-ACBM.

Factors which might affect the decision to collect bulk samples of previously assumed ACBM include:

- additional resources for laboratory analysis are available, or
- assumed ACBM is the only ACBM remaining in a building. The LEA could eliminate periodic surveillance and other ongoing management activities if laboratory analysis confirmed the material as non-ACBM.

- the LEA is planning removal projects or renovations which might affect the assumed ACBM. It is then required to determine whether the material does, in fact, contain asbestos.

The LEA may want to collect additional bulk samples in the following cases:

- the number of samples of pipe fitting insulation or a miscellaneous material appear insufficient to determine if the material is or is not ACBM. An example is where homogeneous areas are very large. EPA strongly recommends that at least three samples be taken in large homogeneous areas, even when the regulations do not require it.

- previously unidentified suspect materials are found during the reinspection. These may be bulk sampled or assumed to contain asbestos.

- materials grouped together for efficiency during the original inspection are now separated into distinct homogeneous sampling areas. An example would be blue 9x9 floor tile and green 9x9 floor tile previously grouped and designated as "all floor tile throughout the building."

☐ **A2d. Determine whether quantities of ACBM should be re-estimated.**

Consider whether the original ACBM quantities were sufficiently accurate for proper management of the material. If actual quantities are significantly different than reported, adjusted cost estimates may affect plans for response actions. In addition, if the LEA now wants to record ACBM quantities room by room, rather than by building, new measurements must be taken. In either case, inspectors' estimates of ACBM quantity are intended for planning purposes only. We recommend that the LEA have their project designer verify the quantities of ACBM in each abatement project during the design development phase.

Decide how the inspector should report quantities of ACBM, i.e., in square feet or linear feet. The AHERA regulations require inspection measurements reported in linear feet or square feet.

Decide also how unit quantities should be handled (as in the case of insulated pipe joints). For abatement purposes, the project designer and contractor normally base their estimates on the number of joints and the diameter of the pipe. This method of reporting is, in fact, easier to track if the location is specific. It may be used in addition to the linear or square feet calculations.

☐ **A2e. Determine whether the inspector should look for previously unidentified suspect materials. (Highly recommended by the EPA.)**

The LEAs must conduct reinspections of all "friable and nonfriable known or assumed ACBM " [see 40CFR763.85(b)]. Thus, if an inspector overlooked a suspect material during the original AHERA inspection, there is no specific requirement that it be included in the reinspection. However, any missed actual or suspect ACBM present in the school represents a violation of AHERA for which both the LEA and the original inspector could be liable. Moreover, since an LEA cannot properly manage asbestos in a building unless it is all identified, we recommend that the original AHERA inspection information be verified, and corrected if necessary, during the reinspection process. With this goal in mind, consider the following materials for inspection:

- materials that were frequently missed in the original inspection - fire doors, resilient sheet flooring/linoleum, interior and exterior duct insulation, and vibration dampening cloth;
- suspect wall materials such as gypsum wallboard (also called sheetrock or drywall), joint compound and hard plaster which the EPA suspects were frequently overlooked;
- distinct materials which were improperly grouped together as a single homogeneous sampling area. Examples are different types or styles of floor tiles and ceiling tiles, and similar acoustical plaster applied at different dates;
- other materials such as boiler fire brick, gaskets, and caulking which may have been missed;
- specific materials of interest to the LEA, such as exterior roofing materials, auditorium curtains, light socket collars, electrical wire insulation, or stored building materials. The regulation does not, however, require inspection of these materials; and
- materials introduced to the building during renovations which have not been properly documented as ACBM or non-ACBM.

☐ **A3. Determine how the reinspection results will be reported.**

Management plans present original inspection results in a variety of formats, many of which are difficult to follow without specialized instruction. The AHERA regulation does not specify the format for reinspection results.

Determine what format will work best for the school. Issues to consider include: Has the original plan been a useful reference in answering questions about ACBM in the school? Are parents and staff interested in detailed reports? Are there numerous materials or numerous ACBM locations, or both, to manage in the school? Do State or local laws have required formats? Do State or local laws exceed Federal requirements?

☐ **A3a. Determine whether locations of ACBM should be reported on a room-by-room basis, rather than by a building or homogeneous sampling area basis.**

The reinspection is a good time to address how to report locations of ACBM. Some management plans report only general locations, e.g., "ceiling tile throughout building." This reporting may be acceptable where 1) only one kind of ceiling tile is present in the building, 2) the material's location is clearly indicated, and 3) the quantity of material is clearly shown. This type of reporting is unacceptable where two or more tile types are present or where both asbestos-containing tiles and non-asbestos-containing tiles are present in the same building.

Reporting locations of ACBM room by room is clearer. Although it may generate extra paperwork for the inspector, it provides the best information for properly managing the materials. In some cases, it may be useful to further describe the location within the room/area. An example would be stating that "transite paneling is installed on the north wall of Room 127" where the other three walls are visually-identical, concrete block walls.

Another approach is to locate each ACBM by describing its entire homogeneous sampling area. In this case, the inspector must clearly define the homogeneous sampling area by an inclusive and exhaustive listing of rooms. Rooms should be identified by number rather than use (such as music room, etc.) since room functions may change. An alternative is for the inspector to highlight on a floorplan all rooms in which the material is present.

☐ **A3b. Determine whether a floorplan or written description, or both, will be used to locate ACBM.**

Decide whether the inspector will record the locations of ACBM by a written description or by highlighting a floorplan, or by some combination of each. In rare cases, floorplans may not be available or readily generated. A floorplan is decidedly more useful than a written description if rooms are not numbered or where numbers may be changed. Even where rooms are numbered, a highlighted floorplan may be the most efficient means of communication. Remember, however, that highlights do not photocopy well.

☐ **A3c. Determine whether ACBM will be assessed on a room by room, homogeneous sampling area, or some other basis.**

Management plans generally report assessment categories for entire homogeneous sampling areas. Although this meets the requirements of the regulation, it may result in small areas with significant damage being ignored because they are part of a larger category of damaged ACBM.

In addition, some management plans do not specify where the damaged ACBM is, e.g., "pipe insulation damage observed in random locations above suspended ceilings." It is useful to assess ACBM in small and specific areas. In this way, the management plan indicates the exact locations of the damaged ACBM.

☐ **A3d. Determine whether photographs or videotape will be used to document material condition.**

Visual records, either photographs or videotape, of ACBM can be very valuable during reinspections. These will show actual changes in materials over time, thus permitting direct comparison between reinspections. These records add to the cost of reinspection, however, and the AHERA regulation does not require them.

CHAPTER 3. INSPECTOR'S REINSPECTION RESPONSIBILITIES

Exhibit B presents the checklist of reinspection activities performed by the inspector. It includes preparatory activities, fieldwork and recordkeeping.

☐ **B1. Review the items on the Reinspection Checklist for the AHERA Designated Person - Planning for the Reinspection.**

Review and understand the decisions made by the designated person for each item on the designated person's reinspection planning checklist (Exhibit A). It is a good idea to meet with the designated person to discuss the scope of work and any specific requests he or she may have.

☐ **B2. Select the field forms to be used (reinspection, reassessment, inspection, bulk sample logs, photograph logs, chain of custody, floorplans).**

Appropriate field forms include:

- reinspection form (see Sample Reinspection Form 2 in Appendix C);
- assessment form, if a separate form is to be used;
- chain of custody and bulk sample collection forms, if additional sampling is expected;
- inspection forms, if previously unidentified materials are to be inspected;
- copies of floorplans, if available; and
- photograph log forms, if photographs are requested.

Ask the designated person to determine whether the forms meet the LEA's specific requirements for the reinspection. Most inspection firms have standardized forms. However, it is usually not too complicated to adopt new formats prior to going into the field.

Exhibit B. Recommended Reinspection Checklist for the Inspector

Planning for the reinspection field activities

- ☐ 1. Review the items on the Reinspection Checklist for the AHERA Designated Person - Planning for the Reinspection.
- ☐ 2. Select the field forms to be used (reinspection, reassessment, inspection, bulk sample logs, photograph logs, chain of custody, floorplans).
- ☐ 3. Review the management plan for the school (see Sample Reinspection Form 1 in Appendix B).
  - ☐ 3a. Obtain or generate a list of all ACBMs and non-ACBMs (and associated identification numbers, if provided) and material categories reported during the original inspection.
  - ☐ 3b. Record the sample results for each homogeneous sampling area of suspect material.
  - ☐ 3c. Record all reported locations of material (descriptions and/or location diagrams) for each homogeneous sampling area.
  - ☐ 3d. Copy the location diagrams, if possible.
  - ☐ 3e. Record the original inspection assessment category assigned to ACBM in each room/area.
  - ☐ 3f. Record any response actions which have occurred and the location of each.
  - ☐ 3g. Record any renovations which have occurred and the location of each.
  - ☐ 3h. Review records of periodic surveillance.
- ☐ 4. Arrange administrative details - time of inspection, school escort, and keys.
- ☐ 5. Assemble all field materials.
  - ☐ 5a. A supply of all field forms, pens, calculator, tape measure, flashlight, and tools.
  - ☐ 5b. Blank floorplans and inspection location diagrams, if available.
  - ☐ 5c. Bulk sample collection tools and clean-up supplies, if required.
  - ☐ 5d. Personal protective equipment, if needed.
  - ☐ 5e. A ladder, if needed.

Exhibit B. Recommended Reinspection Checklist for the Inspector (Continued)

Performing the field activities

- ☐ 6. **Meet the school escort.**
- ☐ 7. **Select the first room/area to be reinspected.**
- ☐ 8. **Observe and record each ACBM in the selected room/area, referring to the list of homogeneous areas of ACBM and non-ACBM abstracted from the management plan (see Sample Reinspection Form 2).**
- ☐ 9. **Mark the rooms/areas where each ACBM was observed on the diagram or floorplan (optional).**
- ☐ 10. **Re-estimate the quantity of each ACBM in the selected room/area (if requested by the designated person).**
- ☐ 11. **Touch each ACBM in the room/area to determine whether it is friable.**
- ☐ 12. **Collect additional bulk samples, as instructed by the designated person.**
- ☐ 13. **Look at the condition and determine the potential for damage or significant damage to each friable ACBM and asbestos-containing TSI in the room/area.**
- ☐ 14. **Assign a reassessment category to each friable ACBM and asbestos-containing TSI in the room/area.**
- ☐ 15. **Record the justification of the assigned reassessment category (can use assessment form or notes).**
- ☐ 16. **Photograph the material, if requested by the designated person.**
- ☐ 17. **Assess previously unidentified materials in the room/area, if requested by the designated person.**
- ☐ 18. **Move to next room/area, and repeat as above.**

Recordkeeping

- ☐ 19. **Complete all field form data items.**
- ☐ 20. **Record name, signature, date, and accreditation number and State (if applicable) on the reinspection form.**

Exhibit B. Recommended Reinspection Checklist for the Inspector (Continued)

Recordkeeping (continued)

☐ **21. If additional bulk samples were collected, include the exact locations where they were taken. Also include a description of the process used to select sample locations, and the name, signature, date, and accreditation number and State (if applicable) of the inspector(s) collecting each bulk sample in each copy of the school's management plan.**

☐ **22. Submit the results of the reinspection to the AHERA designated person within 30 days after the reinspection is completed. Note, at a minimum, any changes in ACBM assessment.**

☐ **B3. Review the management plan for the school (see Sample Reinspection Form 1 in Appendix B).**

It can be difficult to abstract the original inspection data necessary to perform the reinspection properly. This is especially so where a different inspector or company is performing the reinspection.

Management plans present the original AHERA inspection data in a wide variety of formats. The way AHERA regulations list required elements in a management plan commonly led to separation of different types of information into distinct chapters. This forces the reader to flip from chapter to chapter, or table to table, in order to find all the information about a particular material.

In some cases, management plans describe the same material in different ways. Often the plans use material numbers and verbal descriptions interchangeably or inconsistently. In other instances, suspect ACBMs which did not contain asbestos are not clearly indicated as distinct homogeneous sampling areas. Indeed, the only reference to these materials may be in the laboratory report of analyses.

Some states have standardized reporting forms. Where the forms are logically sequenced, cross-referenced, and properly completed, it is generally straightforward to abstract the necessary information. Unfortunately, however, management plans generally do not include instructions for use of these standardized forms.

Sample Reinspection Form 1: Original AHERA Inspection Information Abstracted from the Management Plan (Appendix B) shows one way to record all the information necessary for reinspection concisely. Most buildings have less than 10 suspect ACBMs so, the inspector should need only two or three pages of this form. **This form is not mandatory**. A few pages of the management plan may contain all the necessary information and can be photocopied to take into the field. Most management plans are too bulky to use in the field.

☐ **B3a. Obtain or generate a list of all ACBMs and non-ACBMs (and associated identification numbers, if provided) and material categories reported during the original inspection.**

The AHERA regulation requires a "list of whether homogeneous areas...are surfacing material, thermal system insulation, or miscellaneous material" and "an inventory of the locations of the homogeneous areas..." in the management plan. Based on these requirements, most management plans have some listing of materials from which to begin the complete listing. Do not, however, assume that any single list represents all suspect materials addressed by the inspection. Review the entire management plan to discover whether additional materials are reported elsewhere.

Read the text for any references to miscellaneous materials which were not recorded in the inspection data. For example, firedoors were rarely listed as a suspect material. If addressed at all, they were usually discussed generically as suspect ACBM.

It is just as important to obtain information about non-ACBMs as ACBMs. Later, during the inspection, each material in the building can be clearly identified as ACBM, non-ACBM, or a material which was not previously identified. Often, the only information about non-ACBMs is found in the laboratory results section.

Sometimes management plans discuss fiberglass, foam glass, and rubber materials to explain why certain materials in the building were not sampled. This information could be useful during the reinspection. Record any available information.

☐ **B3b. Record the sample results for each homogeneous sampling area of suspect material.**

After generating the list of ACBMs and non-ACBMs, relate each material to the management plan's findings. These findings are either bulk sample results or the designation "assumed ACBM".

The material description on the bulk sample form or laboratory results and the material descriptions for the homogeneous sampling areas may not be the same. In these cases, it may be possible to match laboratory results to materials by comparing the bulk sample location with the listed locations of the homogeneous sampling areas.

☐ **B3c. Record all reported locations of material (descriptions and/or location diagrams) for each homogeneous sampling area.**

Record the location of each ACBM listed in the management plan. As above, scan the entire management plan for location information. For example, non-ACBMs may be indicated only on the bulk sample collection form. Although this form will probably not list all locations, it is a start and should permit the inspector to identify the material.

Occasionally management plans interchange a room number and a room name. For instance, Room 101 may be called the art room in some sections of the management plan. Discuss these problems with the designated person or building maintenance staff, or refer to the building floorplan.

☐ **B3d. Copy the location diagrams, if possible.**

Some management plans contain marked floorplans to show the locations of each ACBM or homogeneous sampling area. This information is useful and can replace listing of locations if copies can be carried into the field. Note that highlighters don't photocopy well. Make sure you have the original.

☐ **B3e. Record the original inspection assessment category assigned to ACBM in each room/area.**

Record the assessment category assigned to each ACBM during the original inspection. Since the reinspection is a comparison to the original AHERA inspection, be careful not to record assessments from a more recent periodic surveillance report.

The AHERA regulation does not require assessment of undamaged nonfriable ACBM (except asbestos-containing TSI). However, some management planners created a new assessment category 8 for nonfriable ACBM. Others listed them as either category 5 or 6, ACBM with potential for damage or significant damage, respectively. Thus, if a surfacing or miscellaneous ACBM remains nonfriable and undamaged at the time of the reinspection, indicate "no change in assessment." (See page 3-11 for a list of the AHERA assessment categories.)

☐ **B3f. Record any response actions which have occurred and the location of each.**

Record where response actions [including Operations and Maintenance (O&M)] were taken. This information is necessary to perform the reinspection properly. For example, if the LEA removed ACBM from a previously documented location, no material should be found in that location. If the LEA encapsulated ACBM, you must determine the friability and overall condition of the material and encapsulant.

The AHERA regulation requires that management plans contain all documentation about ACBM in a building. Thus, records about any response actions, including initial cleaning, should be available for review. Some records may be bound separately from the original plan. For example, removal project specifications can be very long. Ask the designated person to provide the complete asbestos file for the building.

In some cases, there may be no record of an originally recommended response action being taken. Damaged or significantly damaged ACBM involved in these situations should be carefully checked in the field. If you find that, in fact, the recommended response actions have not been carried out (except for response actions scheduled for some future date), you should bring this information to the designated person's attention.

☐ **B3g. Record any renovations which have occurred and the location of each.**

Although management plans do not have to record general renovations, previously unidentified materials may be exposed by such activities. Review information about renovations so newly revealed suspect materials can be inspected. In order to have accurate information about all ACBM or suspect ACBM, schools should maintain records on the asbestos content of materials installed in their buildings after October 12, 1988.

Under the National Emission Standards for Hazardous Air Pollutants (NESHAP) Asbestos Standard, a school is considered a "facility" and is subject to the requirements of the standard for demolition and renovation.

☐ **B3h. Review records for results of periodic surveillance.**

Periodic surveillance records may contain useful information about an ACBM not recorded elsewhere. Examples include the recording of a small repair activity performed during the periodic surveillance or comments about the cause of new damage to a material.

Remember that the reinspection results must compare current conditions to the original inspection conditions. Be careful not to confuse the results of periodic surveillances with the original inspection results. Periodic surveillances do not have to be performed by accredited inspectors nor are they as comprehensive as a complete AHERA inspection or reinspection.

☐ **B4. Arrange administrative details - time of inspection, school escort, and keys.**

Arrange all administrative details with the designated person before beginning field activities. Many schools do not allow contractors in buildings during school hours. Some may have to arrange for appropriate school personnel to work overtime in the evenings to escort the inspector. Request the keys for all locked areas.

☐ **B5. Assemble all field materials.**

To conduct an efficient reinspection, bring all necessary field materials with you to the building. We suggest the following items:

☐ **B5a. A supply of all field forms, pens, calculator, tape measure, flashlight, and tools.**

Assemble adequate copies of all field forms (see page 3-1, B2). If ACBM quantities are to be re-estimated, you should have a calculator and tape measure. A flashlight is frequently needed to look in areas such as above suspended ceilings, crawlspaces, and closets. Screwdrivers and pliers may be needed to remove access panels, grilles, vents, and electrical plates.

☐ **B5b. Blank floorplans and inspection location diagrams, if available.**

As discussed above, homogeneous sampling area location diagrams generated during the original AHERA inspection are useful. Blank floorplans are also helpful in assuring you have seen all locations and can be used to generate location diagrams. Fire and emergency escape floorplans, usually available for school buildings, are satisfactory substitutes.

☐ **B5c. Bulk sample collection tools and cleanup supplies, if required.**

If the designated person requests that you collect bulk samples of assumed ACBM or previously unidentified materials or makes some other special bulk sample request, assemble appropriate bulk sampling tools. Include clean up supplies such as a spray bottle of encapsulant, paper towels, labeled disposal bags, and a high efficiency particulate air (HEPA) vacuum.

☐ **B5d. Personal protective equipment, if needed.**

You may encounter areas where personal protective equipment is needed. You might need these in a crawlspace or when bulk samples are collected. Pack an appropriate respirator and protective clothing in accordance with the school's or your employer's policies.

☐ **B5e. A ladder, if needed.**

Determine whether you need a ladder to gain access to any area in the school, e.g., above suspended ceilings. Also, find out whether the school will provide a ladder for this activity. Many schools will not provide ladders.

☐ **B6. Meet the school escort.**

Most schools require that a school representative escort building visitors. Review the purpose of the reinspection with the assigned escort and answer his or her questions before beginning the reinspection.

☐ **B7. Select the first room/area to be reinspected.**

Many original inspections began in the boiler room since most thermal system insulation was found there. The first room/area to be reinspected is not as critical since the ACBM types in the building have been identified. Once the first room has been selected, move in a logical pattern through the building so that all areas are reinspected.

☐ **B8. Observe and record each ACBM in the selected room/area, referring to the list of homogeneous areas of ACBM and non-ACBM abstracted from the management plan (see Sample Reinspection Form 2).**

Each suspect ACBM in the room/area should be on the list of information abstracted from the management plan. Identify each ACBM, assumed ACBM, and non-ACBM material. Note the description of each and use consistently in other rooms/areas.

If debris, residue, or overspray of an ACBM is noted in a room/area where it was reported to have been removed, this should be recorded so that the response action can be completed.

If an observed material is not on the list of abstracted information, determine whether the unlisted material is fiberglass, foam glass, rubber or other material which the AHERA regulation excludes from inspection. If it is not an excluded material, it is a previously unidentified material. Proceed in accordance with instructions from the designated person (see page 2-7, A2e).

☐ **B9. Mark the rooms/areas where each ACBM was observed on the location diagram or floorplan (optional).**

Describe the location of each ACBM on the reinspection form. If the designated person wishes additional location diagrams or floorplans, mark them while in each room/area.

☐ **B10. Re-estimate the quantity of each ACBM in the selected room/area (if requested by the designated person).**

If the designated person has requested re-estimation of ACBM quantities, measure each ACBM. Also, make original estimates of the quantity of newly identified suspect material.

☐ **B11. Touch each ACBM in the room/area to determine whether it is friable.**

Touch each ACBM in at least one location. Determine whether the ACBM is friable or nonfriable. A friable material is one which can, when dry, be crumbled, pulverized, or reduced to powder by hand pressure.

It is not advisable to touch friable materials in every location as this may cause unnecessary fiber release. Once you determine a material is friable, you may discontinue touching it. If, however, the material has been encapsulated in a room/area, you should examine it closely across the entire surface and touch it in various locations to ensure the encapsulation is complete for the entire homogeneous area.

Based on the touch determination, the friability rating of an ACBM may be changed during the reinspection:

- Previously considered nonfriable materials may be reclassified as friable, e.g., where water has deteriorated the bonding matrix; or

- Previously considered friable materials may be reclassified as nonfriable, e.g., if an adequate encapsulation of surfacing material or enclosure of TSI has been performed.

☐ **B12. Collect additional bulk samples, as instructed by the designated person.**

If the designated person wants the inspector to collect bulk samples, it is most efficient to collect them while in the room/area. However, in some cases, reinspection must be

completed before bulk sampling can begin. In these cases, define new homogeneous sampling areas and determine random sampling locations in accordance with 40CFR763.86. Whenever the homogeneous area is large, EPA recommends that at least three samples be taken.

☐ **B13. Look at the condition and determine the potential for damage or significant damage to each friable ACBM and asbestos-containing TSI in the room/area.**

Look at the condition of each friable ACBM and asbestos-containing TSI to determine if the material is not damaged, damaged, or significantly damaged. Familiarize yourself with the definition of damaged and significantly damaged friable ACBM as given in the AHERA regulations and interpretive documents. For information on obtaining these documents see Appendix F.

Determine the reasonable potential for damage or significant damage to undamaged friable ACBM and TSI. The AHERA regulations do not specify the procedure for making this determination. Some suggestions include considering the use of the area or the presence of water, vibration, or air streams. An additional factor is the likelihood of human contact with the material. Most inspection companies have created decision trees for use by their employees. Inspector training curricula also provide decision trees for determining potential for damage.

The spatial unit for determination of damage and potential for damage may vary. The entire homogeneous area, the ACBM in each room, or some grouping of rooms/areas may be used. In any case, it is best to record ACBM condition in each room quantitatively and descriptively. For example, record "Room B3 - 10 square feet of surfacing material severely damaged due to water leak above."

☐ **B14. Assign a reassessment category to each friable ACBM and asbestos-containing TSI in the room/area.**

Assign a category to each friable ACBM and each asbestos containing TSI in the room/area. Assign the appropriate AHERA 1 through 7 category (either numerically or in exact words) based on damage, potential for damage, and material category. **Examine the original assessments carefully as the correct number may not have been used, or numbers may not have been used at all.** Also other assessment rankings have been developed and you may use these in addition to but not instead of, the AHERA categories to add detail to the assessments. The seven AHERA assessment categories are as follows:

1. Damaged or significantly damaged TSI ACBM.
2. Damaged friable surfacing ACBM.
3. Significantly damaged friable surfacing ACBM.
4. Damaged or 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.

Even when inspectors use the same assessment scheme, assessment variability may be high. Thus, it is important to review the initial assessment rather than performing "blind" reassessments. If the assessment is different than the original AHERA assessment, but the condition of the material is probably the same, explain this difference. For example, "assessed each room rather than the entire homogeneous sampling area." Use periodic surveillance records as a reference for change.

☐ **B15. Record the justification of the assigned reassessment category (can use assessment form or notes).**

The AHERA regulations require a justification for each reassessment category assigned. This may be done by completing a separate assessment form or simply explaining the assigned category.

Material category, current amount of damage, and potential for damage are the minimum considerations in justifying the assigned assessment category. However, the causes of the damage, the type of damage, the amount and location and accessibility of the material, and types and number of occupants using the area are all important to the management planner in determining appropriate response actions.

☐ **B16. Photograph the material, if requested by the designated person.**

Photograph ACBM in the room/area in accordance with instructions from the designated person.

☐ **B17. Assess previously unidentified materials in the room/area, if requested by the designated person.**

If the designated person wants previously unidentified suspect materials inspected, assess these materials while in the room/area. Classify each material into one of the three material type categories (thermal system insulation, surfacing material, or miscellaneous material), determine friability, and assign an assessment category.

If previously unidentified materials are found, but have not been included as part of the reinspection, we suggest you inform the designated person of the additional material.

☐ **B18. Move to next room/area and repeat as above.**

Start the reinspection in one room/area and proceed in a logical sequence from room to room until all rooms/areas of the building with ACBM have been reinspected.

The AHERA regulation does not require reinspection of rooms/areas in which no ACBM was reported during the original AHERA inspection. Confirm the full scope of the reinspection with the designated person prior to field work. LEAs are being encouraged to reinspect all rooms/areas to correct any deficiencies from the original inspection.

We recommend that rooms/areas in which the presence or absence of ACBM is not well documented be reinspected. Such areas might include:

- areas locked or otherwise inaccessible during the original inspection;
- areas where ACBM might be present but were not clearly indicated in the management plan. Examples include rooms where pipe elbow insulation might be present above the suspended ceiling, or student restrooms which are attached to classrooms but not indicated as containing floor tile;
- areas where renovation may have exposed new material. The EPA did not intend that inspectors undertake destructive steps in locating suspect ACBM and, thus, some materials that were hidden at the time of the original inspection may now be visible because of building renovations; and
- areas where ACBM has been removed (to ensure the completeness of the removal activity).

☐ **B19. Complete all field form data items.**

Review each form to ensure you have completed all data items. Clarify any entries that are incomplete or vague. Make sure your handwriting is legible, and all abbreviations used are clear.

☐ **B20. Record name, signature, date, and accreditation number and State (if applicable) on the reinspection form.**

Sign and date the form and provide current accreditation information.

☐ **B21. If additional bulk samples were collected, include the exact locations where they were taken. Also include a description of the process used to select sample locations, and the name, signature, date, and accreditation number and State (if applicable) of the inspector(s) collecting each bulk sample in <u>each</u> copy of the school's management plan.**

Record all of the information listed above whenever a bulk sample is collected. Many management plans do not describe the procedures used to determine each sampling location. Often, the plan merely quotes the AHERA requirements for the number of random samples based on quantity of surfacing material present. Many do not state how sample locations are determined for each thermal system insulation and miscellaneous material.

☐ **B22. Submit the results of the reinspection to the AHERA designated person within 30 days after the reinspection is completed. Note, at a *minimum*, any changes in ACBM assessment.**

Deliver the reinspection report to the designated person within 30 days after completing the field activities. This report must indicate any changes in ACBM assessment. Thus, if you found no changes in assessment, the reinspection report can be as simple as a letter stating that fact. The designated person may, however, have requested a more elaborate report documenting the actual locations and the specific ACBMs reinspected.

CHAPTER 4. MANAGEMENT PLANNER'S REINSPECTION RESPONSIBILITIES

Exhibit C presents the management planner's checklist of reinspection activities, including recommendations for response actions and recordkeeping. These activities are described in this chapter.

☐ **C1. Review the results of the original AHERA inspection, periodic surveillance records, and the reinspection.**

Review the original inspection report, periodic surveillance records, and the completed reinspection forms and report in preparation for making response action recommendations.

☐ **C2. Visit the school or take other necessary actions to recommend response actions to the LEA.**

Take any additional steps needed to make response action recommendations. Such steps may include visiting the building to consider the possible alternative response actions, talking with the inspector to clarify the reassessment information, and reviewing the budget constraints and planned response actions at the school with the designated person.

☐ **C3. For each friable surfacing and miscellaneous ACBM and each asbestos-containing TSI reported by the inspector, make written response action recommendations.**

Written recommendations for response actions are particularly important if either the assessment or friability determination has changed since the original inspection, or if the reinspection discovers previously unidentified ACBM.

☐ **C3a. Describe preventive measures and response actions for each assessment location of the ACBM.**

Describe the exact response actions or preventive measure you recommend. For example, preventive measures might include repairing a water leak to prevent further deterioration of pipe joint insulation, installing a doorstop to prevent damage to asbestos wallboard, or instructing teachers not to hang anything from asbestos-containing ceiling tiles.

Describe "how to" perform repairs to ACBM if this response action is recommended. For example, do not say "repair damaged pipe insulation." Rather, say "use wettable lagging and encapsulant to repair damage."

Exhibit C. Recommended Reinspection Checklist for the Management Planner

Recommendations for response actions

- ☐ 1. **Review the results of the original AHERA inspection, periodic surveillance records, and the reinspection.**
- ☐ 2. **Visit the school or take other necessary actions to recommend response actions to the LEA.**
- ☐ 3. **For each friable surfacing and miscellaneous ACBM and each asbestos-containing TSI reported by the inspector, make written response action recommendations.**
  - ☐ 3a. **Describe preventive measures and response actions for each assessment location of the ACBM.**
  - ☐ 3b. **Consider whether cleaning in accordance with procedures in 40CFR763.91(c) should be performed in each area and make appropriate recommendations in writing.**
- ☐ 4. **Include a schedule for beginning and completing the recommended cleaning and response actions.**
- ☐ 5. **Estimate the resource requirements for the recommended response actions.**
- ☐ 6. **Review the adequacy of the O&M Plan.**

Recordkeeping

- ☐ 7. **Record name, signature, date, and accreditation number and State (if applicable) on the reinspection form.**
- ☐ 8. **Submit written recommendations for the response actions to the designated person.**

☐ **C3b. Consider whether cleaning in accordance with procedures in 40CFR763.91(c) should be performed in each area and make appropriate recommendations in writing.**

Recommend additional cleaning where friable ACBM, assumed friable ACBM, or damaged or significantly damaged TSI is present. Specify cleaning methods and frequency. Indicate each specific room/area requiring cleaning. Rather than parrot the regulation's statement that cleaning must be performed in certain instances, specify how, when, and where to perform cleaning.

☐ **C4. Include a schedule for beginning and completing the recommended cleaning and response actions.**

Specify a schedule that designates actual dates for beginning and completing each response action recommended so that human health and the environment are protected.

☐ **C5. Estimate the resource requirements for the recommended response actions.**

Estimate the resource requirements for all response actions you recommend. This should be a comprehensive presentation of all estimated costs. Include purchase of required ACBM maintenance equipment and supplies, training of personnel, removal costs (including design fees), and air sampling and laboratory costs.

☐ **C6. Review the adequacy of the O&M Plan.**

Although not specifically required by the AHERA regulation, you should review the adequacy of the written O&M Plan to maintain all ACBM in good condition. If deficiencies are found, make recommendations for changes to the designated person. An example might be to recommend additional training for maintenance personnel in a school where repairs to ACBM have not been sufficient to prevent the release of fibers into the air.

☐ **C7. Record name, signature, date, and accreditation number and State (if applicable) on the recommendation form.**

Sign the written recommendations for response actions and provide current accreditation information.

☐ **C8. Submit written recommendations for response actions to the designated person.**

Forward the written recommendations to the designated person. The AHERA regulations do not specify a time frame for this submittal, but it is important to be as prompt as possible and probably should not exceed 30 days. The reinspection is not complete until the management planner has submitted written recommendations.

CHAPTER 5. AHERA DESIGNATED PERSON'S RECORDKEEPING RESPONSIBILITIES

The designated person has the final responsibility for recordkeeping. This recordkeeping is detailed in Exhibit D.

☐ **D1. Include the reinspection report and recommended response actions in each copy of the school's management plan.**

Include a reinspection report in every copy of the management plan. In addition to maintaining the report at the district administrative offices and the school's administrative office, as required, the LEA may have copies maintained at maintenance or custodial offices and the designated person's office.

☐ **D2. Include a written statement indicating agreement or disagreement with the management planner's recommendations for response actions, justification for any disagreement, and an implementation schedule for the response actions in the management plan. (Recommended by the EPA.)**

Write a statement showing agreement or disagreement with the recommended response actions. Assist in the preparation of a schedule for implementation of the response actions. This schedule must be within the time frame specified by the management planner. If this is not possible, present justification for why the time frame will not be met, and a plan for how the affected materials will be managed in the interim under the O&M Plan.

☐ **D3. Include inspection report findings for any previously unidentified materials (and, if ACBM is found, include management planner recommendations) in the management plan.**

If previously unidentified materials were inspected, include the inspection report in the management plan. An inspection report is similar to the reinspection report with additional information. Refer to the AHERA regulation or contact a State or EPA Regional Asbestos Coordinator (Appendix I) for details on inspection reports.

☐ **D4. Include a copy of a document describing steps taken to inform workers and building occupants, or their legal guardians, about the reinspection in each copy of the school's management plan.**

The AHERA regulation allows a great deal of flexibility in the methods used to notify parents and staff of the reinspection. Letters to PTA and the employee's union, an article in an LEA newsletter, or letters to each parent about the reinspection are all appropriate methods of notification. At a minimum, inform parents and staff that a reinspection has occurred. It may also be useful to tell them of any new materials

Exhibit D. Recommended Reinspection Checklist for the AHERA Designated Person - Recordkeeping

- ☐ 1. **Include the reinspection report and recommended response actions in each copy of the school's management plan.**
- ☐ 2. **Include a written statement indicating agreement or disagreement with the management planner's recommendations for response actions, justification for any disagreement, and an implementation schedule for the response actions in the management plan. (Recommended by the EPA.)**
- ☐ 3. **Include inspection report findings for any previously unidentified materials (and, if ACBM found, include management planner recommendations) in the management plan.**
- ☐ 4. **Include a copy of a document describing steps taken to inform workers and building occupants, or their legal guardians, about the reinspection in each copy of the school's management plan.**
- ☐ 5. **Evaluate the effectiveness of the asbestos operations and maintenance (O&M) program and periodic surveillance. Revise, as appropriate.**

found. Parents and staff generally prefer a letter for each school with comments about specific materials. Exhibit E presents a sample letter for notification of reinspection. Information about reinspections must also be included in the required annual notification to parents and workers.

The AHERA regulations do not clearly specify the time frame for providing notification of reinspections. It is best however, that the LEA or school provide notification as soon as possible after receiving the reinspection report and recommendations. At a minimum, include information about the reinspection in the annual notification about management plan availability.

Once parents and staff are notified, include a dated notification in the management plan as documentation. Notify the State, if required.

☐ **D5. Evaluate the effectiveness of the asbestos Operations and Maintenance (O&M) Program and periodic surveillance. Revise, as appropriate.**

When the reinspection is complete, take time to evaluate whether the asbestos O&M Program has been effective in maintaining all ACBM. Think about problems the staff has experienced in implementing O&M procedures. Consider alternative procedures and revise the written O&M Program to reflect these changes. An example is adding a written work permit system to prevent maintenance staff from drilling into asbestos-containing ceiling material. Also, consider whether the periodic surveillance was effective in identifying areas of increased deterioration and damage, and alter the schedule for areas needing closer scrutiny.

Delete any O&M procedure which is no longer applicable. An example is deleting the written procedure for repairing pipe elbow insulation after all TSI is removed from the school.

Exhibit E. Recommended Sample Reinspection Notification Letter

EASTSIDE COMMUNITY PUBLIC SCHOOLS

East Park Avenue
Eastside, CA 91005
(999) 922-3333

Bob Smith, Superintendent

Notification of Asbestos Reinspections

TO: Parents and Staff of Eastside Middle School

FROM: Bob Smith, Superintendent of Schools

DATE: December 15, 1991

In compliance with the U.S. Environmental Protection Agency (EPA) Asbestos Hazard Emergency Response Act (AHERA), in the fall of 1988 we performed inspections of each of our school buildings for asbestos-containing building materials. The inspection findings and asbestos management plans have been on file in each school administrative office since that time.

The EPA requires us to perform reinspections of the asbestos materials every three years. During the months of September through November 1991, accredited asbestos inspectors performed these reinspections. An accredited management planner reviewed the results of the reinspections and recommended actions we should take to safely manage each asbestos material in our buildings.

Two significant findings were noted during the reinspection of Eastside Middle School:

- Asbestos-containing water pipe insulation in the kitchen over the dishwasher is slowly deteriorating due to high humidity. The material is scheduled for removal over the Christmas break.

- Linoleum in all bathrooms was not included in the original AHERA inspection. The backing (between the vinyl layer and the floor) is assumed to contain asbestos. The vinyl layer is in good condition and provides an effective barrier, preventing asbestos fiber release. This material has been added to our asbestos maintenance program and we will monitor it for any changes in condition.

All other asbestos materials in this school are in good condition and we will continue to manage them in place, as recommended by the accredited management planner.

The results of the reinspection are on file in the management plan in the school's administrative office. Everyone is welcome to view these anytime during normal school hours (M-F, 8:00 a.m. - 4:30 p.m.). The Asbestos Program Manager, Jill Williams, is available to answer any questions you may have about asbestos in our buildings at (999) 922-3334.

APPENDIX A

AHERA REGULATORY
CITATIONS FOR REINSPECTIONS

AHERA REGULATORY CITATIONS FOR REINSPECTIONS

The following are quotations cited in this document from the AHERA regulations published October 30, 1987. They are presented to assist LEAs, AHERA designated persons, inspectors, and management planners in performing their responsibilities.

40 CFR 763.84 General Local Education Agency Responsibilities

(c) Ensure that workers and building occupants, or their legal guardians, are informed at least once each school year about inspections, response actions, and post-response action activities, including periodic reinspection and surveillance activities that are planned or in progress.

40 CFR 763.85 Inspections and Reinspections

(b) Reinspections

(1) At least once every 3 years after a management plan is in effect, each local education agency shall conduct a reinspection of all friable and nonfriable known or assumed ACBM in each school building that they lease, own, or otherwise use as a school building.

(2) Each inspection shall be made by an accredited inspector.

(3) For each area of a school building, each person performing a reinspection shall:

(i) Visually reinspect, and reassess, under § 763.88, the condition of all friable known or assumed ACBM.

(ii) Visually inspect material that was previously considered nonfriable ACBM and touch the material to determine whether it has become friable since the last inspection or reinspection.

(iii) Identify any homogeneous areas with material that has become friable since the last inspection or reinspection.

(iv) For each homogeneous area of newly friable material that is already assumed to be ACBM, bulk samples may be collected and submitted for analysis in accordance with § 763.86 and § 763.87.

(v) Assess, under § 763.88, the condition of the newly friable material in areas where samples are collected, and newly friable materials in areas that are assumed to be ACBM.

(vi) Reassess, under § 763.88, the condition of friable known or assumed ACBM previously identified.

(vii) Record the following and submit to the person designated under § 763.84 a copy of such record for inclusion in the management plan within 30 days of the reinspection:

(A) The date of the reinspection, the name and signature of the person making the reinspection, State of accreditation, and if applicable, his or her accreditation number, and any changes in the condition of known or assumed ACBM.

(B) The exact locations where samples are collected during the reinspection, a description of the manner used to determine sampling locations, the name and signature of each accredited inspector who collected the samples, State of accreditation, and, if applicable, his or her accreditation number.

(C) Any assessments or reassessments made of friable material, the name and signature of the accredited inspector making the assessments, State of accreditation, and if applicable, his or her accreditation number.

40 CFR 763.93 Management Plans

(d) Each local educational agency shall maintain and update its management plan to keep it current with ongoing operations and maintenance, periodic surveillance, inspection, reinspection, and response action activities. All provisions required to be included in the management plan under this section shall be retained as part of the management plan, as well as any information that has been revised to bring the plan up-to-date.

(e) The management plan shall be developed by an accredited management planner and shall include:

(1) A list of the name and address of each school building and whether the school building contains friable ACBM, nonfriable ACBM, and friable and nonfriable suspected ACBM assumed to be ACM.

(2) For each inspection conducted before December 14, 1987:

(i) The date of the inspection.

(ii) A blueprint, diagram, or written description of each school building that identifies clearly each location and approximate square or linear footage of any homogeneous or sampling area where material was sampled for ACM, and, if possible, the exact locations where bulk samples were collected, and the dates of collection.

(iii) A copy of the analyses of any bulk samples, dates of analyses, and a copy of any other laboratory reports pertaining to the analyses.

(iv) A description of any response actions or preventive measures taken to reduce asbestos exposure, including if possible, the names and addresses of all contractors involved, start and completion dates of the work, and results of any air samples analyzed during and upon completion of the work.

(v) A description of assessments, required to be made under § 763.88, of material that was identified before December 14, 1987, as friable ACBM or friable suspected ACBM assumed to be ACM, and the name and signature, State of accreditation, and if applicable, accreditation number of each accredited person making the assessments.

(3) For each inspection and reinspection conducted under § 763.85:

(i) The date of the inspection or reinspection and the name and signature, State of accreditation and, if applicable, the accreditation number of each accredited inspector performing the inspection or reinspection.

(ii) A blueprint, diagram, or written description of each school building that identifies clearly each location and approximate square or linear footage of homogeneous areas where material was sampled for ACM, the exact location where each bulk sample was collected, date of collection, homogeneous areas where friable suspected ACBM is assumed to be ACM, and where nonfriable suspected ACBM is assumed to be ACM.

(iii) A description of the manner used to determine sampling locations, and the name and signature of each accredited inspector collecting samples, the State of accreditation, and if applicable, his or her accreditation number.

(iv) A copy of the analyses of any bulk samples collected and analyzed, the name and address of any laboratory that analyzed bulk samples, a statement that the laboratory meets the applicable requirements of § 763.87(a) the date of analysis, and the name and signature of the person performing the analysis.

(v) A description of assessments, required to be made under § 763.88, of all ACBM and suspected ACBM assumed to be ACM, and the name, signature, State of accreditation, and if applicable, accreditation number of each accredited person making the assessments.

(4) The name, address, and telephone number of the person designated under § 763.84 to ensure that the duties of the local education agency are carried out, and the course name, and dates and hours of training taken by that person to carry out the duties.

(5) The recommendations made to the local education agency regarding response actions, under § 763.88(d), the name, signature, State of accreditation of each person making the recommendations, and if applicable, his or her accreditation number.

(6) A detailed description of preventive measures and response actions to be taken, including methods to be used, for any friable ACBM, the locations where such measures and action will be taken, reasons for selecting the response action or preventive measure, and a schedule for beginning and completing each preventive measure and response action.

(7) With respect to the person or persons who inspected for ACBM and who will design or carry out response actions, except for operations and maintenance, with respect to the ACBM, one of the following statements:

(i) If the State has adopted a contractor accreditation program under section 206(b) of Title II of the Act, a statement that the person(s) is accredited under such plan.

(ii) A statement that the local education agency used (or will use) persons who have been accredited by another State which has adopted a contractor accreditation plan under section 206(b) of Title II of the Act or is accredited by an EPA-approved course under section 206(c) of Title II of the Act.

(8) A detailed description in the form of a blueprint, diagram, or in writing of any ACBM or suspected ACBM assumed to be ACM which remains in the school once response actions are undertaken pursuant to § 763.90. This description shall be updated as response actions are completed.

(9) A plan for reinspection under § 763.85, a plan for operations and maintenance activities under § 763.91, and a plan for periodic surveillance under § 763.92, a description of the recommendation made by the management planner regarding additional cleaning under § 763.91(c)(2) as part of an operations and maintenance program, and the response of the local education agency to that recommendation.

(10) A description of steps taken to inform workers and building occupants, or their legal guardians, about inspections, reinspections, response actions, and post-response action activities, including periodic reinspection and surveillance activities that are planned or in progress.

(11) An evaluation of the resources needed to complete response actions successfully and carry out reinspection, operations and maintenance activities, periodic surveillance and training.

(12) With respect to each consultant who contributed to the management plan, the name of the consultant and one of the following statements:

(i) If the State has adopted a contractor accreditation plan under section 206(b) of Title II of the Act, a statement that the consultant is accredited under such plan.

(ii) A statement that the contractor is accredited by another State which has adopted a contractor accreditation plan under section 206(b) of Title II of the Act, or is accredited by an EPA-approved course developed under section 206(c) of Title II of the Act.

40 CFR 763.99 Exclusions

(a) A local education agency shall not be required to perform an inspection under § 763.85(a) in any sampling area as defined in 40 CFR 763.103 or homogeneous area of a school building where:

(1) An accredited inspector has determined that, based on sampling records, friable ACBM was identified in that homogeneous or sampling area during an inspection conducted before December 14, 1987. The inspector shall sign and date a statement to that effect with his or her State of accreditation and if applicable, accreditation number and, within 30 days after such determination, submit a copy of the statement to the person designated under § 763.84 for inclusion in the management plan. However, an accredited inspector shall assess the friable ACBM under § 763.88.

(2) An accredited inspector has determined that, based on sampling records, nonfriable ACBM was identified in that homogeneous or sampling area during an inspection conducted before December 14, 1987. The inspector shall sign and date a statement to that effect with his or her State of accreditation and if applicable, accreditation number and, within 30 days after such determination, submit a copy of the statement to the person designated under § 763.84 for inclusion in the management plan. However, an accredited inspector shall identify whether material that was nonfriable has become friable since that previous inspection and shall assess the newly-friable ACBM under § 763.88.

(3) Based on sampling records and inspection records, an accredited inspector has determined that no ACBM is present in the homogeneous or sampling area and the records show that the area was sampled, before December 14, 1987 in substantial compliance with § 763.85(a), which for purposes of this section means in a random manner and with a sufficient number of samples to reasonably ensure that the area is not ACBM.

(i) The accredited inspector shall sign and date a statement, with his or her State of accreditation and if applicable, accreditation number that the homogeneous or sampling area determined not to be ACBM was sampled in substantial compliance with § 763.85(a).

(ii) Within 30 days after the inspector's determination, the local education agency shall submit a copy of the inspector's statement to the EPA Regional Office and shall include the statement in the management plan for that school.

(4) The lead agency responsible for asbestos inspection in a State that has been granted a waiver from § 763.85(a) has determined that, based on sampling records and inspection records, no ACBM is present in the homogeneous or sampling area and the records show that the area was sampled before December 14, 1987, in substantial compliance with § 763.85(a). Such determination shall be included in the management plan for that school.

(5) An accredited inspector has determined that, based on records of an inspection conducted before December 14, 1987, suspected ACBM identified in that homogeneous or sampling area is assumed to be ACM. The inspector shall sign and date a statement to that effect, with his or her State of accreditation and if applicable, accreditation number and, within 30 days of such determination, submit a copy of the statement to the person designated under § 763.84 for inclusion in the management plan. However, an accredited inspector shall identify whether material that was nonfriable suspected ACBM assumed to be ACM has become friable since the previous inspection and shall assess the newly friable material and previously identified friable suspected ACBM assumed to be ACM under § 763.88.

(6) Based on inspection records and contractor and clearance records, an accredited inspector has determined that no ACBM is present in the homogeneous or sampling area where asbestos removal operations have been conducted before December 14, 1987, and shall sign and date a statement to that effect and include his or her State of accreditation and, if applicable, accreditation number. The local education agency shall submit a copy of the statement to the EPA Regional Office and shall include the statement in the management plan for that school.

(7) An architect or project engineer responsible for the construction of a new school building built after October 12, 1988, or an accredited inspector signs a statement 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. The local education agency shall submit a copy of the signed statement of the architect, project engineer, or accredited inspector to the EPA Regional Office and shall include the statement in the management plan for that school.

APPENDIX B

SAMPLE REINSPECTION FORM 1:
ORIGINAL AHERA INSPECTION INFORMATION
ABSTRACTED FROM THE MANAGEMENT PLAN
AND INSTRUCTIONS FOR USING REINSPECTION FORM 1

Sample Reinspection Form 1. Original AHERA Inspection Information Abstracted from the Management Plan Page _____ of _____

School _____ Building _____ Date(s) of Original AHERA Inspection _____

Homogeneous sampling areas		Material category	Asbestos content	Friability	AHERA assessment category (1-7, X, None)	Recorded locations of material for each assessment category	Response actions taken/ renovations/other comments
ID number	Material description						
		TSI Surf. Misc.	Assumed Yes No	F NF X			
		TSI Surf. Misc.	Assumed Yes No	F NF X			
		TSI Surf. Misc.	Assumed Yes No	F NF X			
		TSI Surf. Misc.	Assumed Yes No	F NF X			
		TSI Surf. Misc.	Assumed Yes No	F NF X			
		TSI Surf. Misc.	Assumed Yes No	F NF X			

Information abstracted by _____ Date _____

Friability: F = friable, NF = nonfriable, X = not applicable (material is non-ACBM)

AHERA assessment category: 1 = Damaged or significantly damaged TSI ACBM, 2 = Damaged friable surfacing ACBM, 3 = Significantly damaged friable surfacing ACBM, 4 = Damaged or 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, X = not applicable (material is non-ACBM or nonfriable surfacing or miscellaneous material), None = No assessment category provided in original inspection.

SAMPLE REINSPECTION FORM 1: ORIGINAL AHERA INSPECTION INFORMATION ABSTRACTED FROM THE MANAGEMENT PLAN

Instructions for Use

Assemble the management plan and all related documentation, e.g., removal records and periodic surveillance reports, for the school. It is best if the inspector who will perform the reinspection completes this form, but anyone familiar with inspection and reinspection protocols may do so. A completed example of Form 1 is presented on page B-6 to illustrate the process.

School

Enter the name of the school whose AHERA management plan you are reviewing.

Building

Enter the name of the first building whose inspection information you are reviewing. If there is more than one building at the school, complete a separate Form 1 for each building.

Date(s) of Original AHERA Inspection

Locate the date(s) on which the original AHERA inspection occurred in the building and record.

Homogeneous sampling areas - ID number

Scan the management plan for a list or other description of homogeneous sampling areas, including all non-ACBM homogeneous sampling areas. As you find each one, record the identification number assigned to the material. If an identification number was not assigned, enter "X" in this block.

Homogeneous sampling areas - Material description

Record the complete, word-for-word description of each ACBM and non-ACBM homogeneous sampling area next to the appropriate ID number. An example is "2x4 white lay-in ceiling tile" or "2x4 off-white ceiling tile." Small variations in descriptions can be important in differentiating homogeneous sampling areas during subsequent fieldwork. Fill in the quantity of the material where that could help in differentiating between similar materials. Check the list of bulk samples collected and the laboratory report for possible non-ACBMs.

Material category

Find the assigned material category for each material identified (TSI, surfacing material or miscellaneous material) and circle the corresponding category in this column.

Asbestos content

Find the asbestos content of each homogeneous sampling area. Circle "Assumed" if the material was assumed to contain asbestos, "Yes" if the material is known to contain asbestos based on laboratory analysis of bulk samples, or "No" if the material is known to be non-asbestos-containing based on laboratory analysis of bulk samples, or non-ACBM by definition (e.g., metal, wood, fiberglass, or rubber).

Friability

Find the AHERA inspection's friability determination for the known and assumed ACBM. Circle "F" if the material was rated as friable, "NF" if the material was rated as nonfriable, or "X" if the material was determined to be non-ACBM.

AHERA assessment category (1-7, X, None)

Find the assessment category(ies) assigned to the friable homogeneous sampling areas of ACBM and the asbestos-containing TSI. If they were assigned as AHERA category 1-7, record in this column. Examine the original assessments carefully as the correct number may not have been used, or numbers may have not been used at all. Refer to the definitions on the bottom of Sample Form 1 if words are used in the original management plan. If more than one category was assigned, write each of these in a separate row next to the appropriate locations (see the two pipe elbow insulation entries on the completed example of Sample Form 1). If the original AHERA inspection did not use the AHERA 1-7 categories, record the original insepction's actual words in this column.

If the material is non-ACBM or was rated nonfriable surfacing or miscellaneous material, no assessment was required. Enter "X" in this column. If no assessment category is provided for friable ACBM as required, record "none" in this column.

Recorded locations of material for each assessment category

Scan the management plan for all listed or otherwise described locations of the material. Be sure to check bulk sample collection locations, especially for non-ACBMs. Record each room/area in which the material is present.

If a floorplan shows the locations of the material in the management plan, a copy of the floorplan can replace the listing of all rooms/areas in this column. In this case, simply write "see attached floorplan" in the space provided.

You should list the rooms/areas by assessment category and general location in the school on this form. For example, if pipe elbow insulation in the boiler room was reported as assessment category 1, list the boiler room in a separate row next to assessment category 1. If the pipe elbow insulation above ceiling tiles was reported as assessment category 5, list these areas in a separate row next to assessment category 5 (see the completed example of Sample Form 1).

Response Actions Taken/Renovations/Other Comments

Review the management plan for all completed response actions. In addition, consult the designated person about response actions taken and renovations which have occurred in the building. Renovations, in particular, may not be indicated in the management plan. Summarize response actions and renovations in the space provided.

If a material is non-ACBM, AHERA regulations do not require response actions. Enter "X" in this column (see row 3 of completed example of Sample Form 1). If an ACBM is nonfriable, response action recommendations are not required but were often recommended or performed. Enter "X" or a brief summary, as appropriate. Row 1 of Sample Form 1 shows an example of this latter situation where floor tile rated as nonfriable was included in the O&M program.

Information Abstracted By Date

Sign the form and record the date on the lines provided.

Continue to the next blank row for each homogeneous sampling area reported in the management plan until you have described all materials in the building. Use more than one Form 1 when there are more than six materials with different assessment categories in a building. Number all pages when inspection information has been abstracted for all materials in the building. For example, number two pages, page 1 of 2 and page 2 of 2.

If there is more than one building to be reinspected at the school, complete one or more Form 1s for each building.

COMPLETED EXAMPLE

Sample Reinspection Form 1. Original AHERA Inspection Information Abstracted from the Management Plan

School Lafayette Elementary Building Classroom Building 2 Date(s) of Original AHERA Inspection 11/4/88

Homogeneous sampling areas		Material category	Asbestos content	Friability	AHERA assessment category (1-7, X, None)	Recorded locations of material for each assessment category	Response actions taken/ renovations/other comments
ID number	Material description						
HA-01	Floor Tile	TSI, Surf., (Misc.)	(Assumed), Yes, No	F, (NF), X	X	Throughout School	Included in O+M Program
HA-02	1x1 Ceiling Tile	TSI, Surf., (Misc.)	Assumed, (Yes), No	(F), NF, X	5	Rooms 101-110, Hallway A+B, Main Office, Teacher's Lounge	All Ceiling Tile (1x1) Encapsulated 12/88
HA-03	2x4 Ceiling Tile	TSI, Surf., (Misc.)	Assumed, Yes, (No)	F, NF, (X)	X	Lunchroom	X
HA-04	Fire Doors	TSI, Surf., (Misc.)	(Assumed), Yes, No	F, (NF), X	X	All Exterior Entrances, Boiler Room	NONE
HA-05	Pipe Elbow Ins	(TSI), Surf., Misc.	Assumed, (Yes), No	(F), NF, X	1	Boiler Room	Removed 12/88
	" " "	(TSI), Surf., Misc.	Assumed, (Yes), No	F, (NF), X	5	Above Ceiling Tile Throughout Building	O+M

Information abstracted by Jane Smith Date 10/7/91

Friability: F = friable, NF = nonfriable, X = not applicable (material is non-ACBM)

AHERA assessment category: 1 = Damaged or significantly damaged TSI ACBM, 2 = Damaged friable surfacing ACBM, 3 = Significantly damaged friable surfacing ACBM, 4 = Damaged or 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, X = not applicable (material is non-ACBM or nonfriable surfacing or miscellaneous material), None = No assessment category provided in original inspection.

APPENDIX C

SAMPLE REINSPECTION FORM 2:
REINSPECTION OF ACBM: FINDINGS AND MANAGEMENT
PLANNER RECOMMENDATIONS AND
INSTRUCTIONS FOR USING REINSPECTION FORM 2

Sample Reinspection Form 2. Reinspection of ACBM: Findings and Management Planner Recommendations

School _____ Building _____ Date(s) of Reinspection _____

Homogeneous Sampling Area: Material Description _____ ID Number _____

REINSPECTION FINDINGS FOR ACBM						MANAGEMENT PLANNER RECOMMENDATIONS		
Location(s) of ACBM by assessment category	Quantity	Friability	Assessment category (1-7, X)	Justification of assessment category	Change in assessment	Preventive measures, response actions, and initial/additional cleanings	Schedule: Begin	Schedule: Complete
		F NF			Yes No			
		F NF			Yes No			
		F NF			Yes No			
Were additional samples of this ACBM collected? Yes No						Date of management planner review: _____		
Inspector name _____ Inspector signature _____ Accreditation #/State _____ Expiration date _____						Management planner name _____ Management planner signature _____ Accreditation #/State _____ Expiration date _____		
I, the LEA's Designated Person, have read and understood the recommendations made above: _____ Date: _____								

SAMPLE REINSPECTION FORM 2: REINSPECTION OF ACBM FINDINGS AND MANAGEMENT PLANNER RECOMMENDATIONS

Instructions For Use

Use Form 2 to record information about a single homogeneous sampling area of ACBM. Complete a separate Form 2 for each different ACBM observed. Note, however, that this form does not fulfill all requirements for a reinspection under AHERA.

The inspector, management planner, and designated person each have a role in completing this form. The inspector completes the left-hand portion of the form as described below on pages C-3 to C-6. The management planner completes the right-hand portion of the form as described on pages C-7 to C-8. The designated person completes the bottom row of the form as described on page C-9. A completed Form 2 is presented on page C-10 to aid in understanding these instructions.

School

Enter the name of the school to be reinspected.

Building

Enter the name of the first building to be reinspected. If there is more than one building at the school, complete a separate set of forms for each building.

Date(s) of Reinspection

Enter the date(s) during which the building reinspection occurs.

Homogeneous Sampling Area: Material Description

Refer to the original inspection information on Form 1 (or other similar source). On Form 2, write the complete, word-for-word description of one asbestos-containing homogeneous sampling area observed in the first room. It is important to differentiate similar homogeneous areas of material at this point, e.g., 2x4 white lay-in ceiling tile (or panels) versus 2x4 off-white ceiling tile.

Homogeneous Sampling Area - ID Number

If the management plan assigns identification numbers to the asbestos-containing homogeneous sampling area, record the number in the space provided. If identification numbers were not assigned, enter "X" in this block.

Locations of ACBM by assessment category

Record each room/area where you observe the material during the reinspection. It is preferable to list each individual room/area where the material is present, one to a row, in this column. However, grouping rooms is acceptable as long as it is clear which rooms are included in the grouping. Each room/area in a group must receive the same assessment category. For example, recording "Rooms #101-110" is acceptable if (1) all 10 rooms contain the material, (2) all material is in the same condition, and (3) all material has the same potential for damage. Maintaining the same groupings of rooms as used in the original inspection may ease comparison between assessments and reassessments.

If the designated person has requested that the inspector mark a floorplan with the location of each material, do that now.

Quantity

If the reinspection will re-estimate material quantities or report them on a room by room basis, measure the dimensions of the material in the room/area and record in the space provided. If the reinspection will not re-estimate quantities, enter "X" in the space provided.

Friability

Touch the material as required to make the friability determination for the room/area. Circle "F" if the material is friable, or "NF" if it is nonfriable.

Assessment category

Assign the appropriate assessment category 1-7 to friable ACBM and all asbestos-containing TSI. Enter the number in this column. If you are segregating the material into two or more assessment categories, write each number in a separate row adjacent to the room/area descriptions appropriate to the assessment (note the three assessment categories assigned the 1x1 ceiling tile on the completed example of Sample Form 2).

If the material is nonfriable surfacing or miscellaneous ACBM, enter "X" in this column (see row 1 on the completed example of Sample Form 2).

Justification of assessment category

Briefly describe the rationale for assigning the assessment category, mentioning the cause of any damage or potential for damage. The justification is particularly important if a change in the assessment has occurred.

Some inspection companies use specialized assessment forms to record the factors they consider in assigning the assessment category. Many have a decision tree leading the inspector to the assigned assessment category based on the information from the assessment form. These forms are acceptable alternatives to the written justification used on Form 2. If you use these forms, write "see assessment form(s)" in this column and attach the completed forms.

Change in assessment

Compare the AHERA inspection assessment data on Form 1 (or equivalent) for the material in the location selected. If there is a difference between the original and the reinspection assessment, circle "Yes". If no difference was noted, circle "No".

If different spatial units are used for the reassessments, consider whether substantive changes have actually occurred to the material in the selected location and circle "Yes" or "No" accordingly.

When all ACBM in the selected room/area has been reinspected, go to the next room/area and repeat as above until each room listed in the original EPA inspection as having ACBM has been reinspected.

Continue to the next row on Form 2 and record each location in which an ACBM is observed. Use more than one Form 2 when there are more than three locations of an ACBM with different assessment categories in a building. Number all pages when all rooms/areas have been reinspected. Count the number of pages for each ACBM, then number page 1 of 2, page 2 of 2, and so forth.

Before leaving a room/area, perform an inspection for previously unidentified materials if designated person has requested one.

Were additional samples of this ACBM collected?

If additional bulk samples of the ACBM are collected, circle "Yes". This is a flag to the management planner and designated person to look for the bulk sample records and laboratory analysis results. If no bulk samples of the ACBM were collected, circle "No."

Inspector name

Clearly print your name.

Inspector signature

Sign your name.

Accreditation #/State

Record your AHERA inspector accreditation number and state of accreditation, if applicable.

Expiration date

Record the expiration date of your accreditation. This date must be later than the date of the reinspection.

Submit the reinspection form(s) to the designated person who will submit it to the management planner for recommendations for response actions.

The management planner completes the right-hand portion of Sample Form 2. The management planner may need to visit the building or take other actions to determine appropriate response actions. This should be done before completing the form, as required.

Preventive measures, response actions and initial/additional cleanings

Review the results of the reinspection of each ACBM in each room/area and recommend the appropriate response actions including preventive measures. Consider whether initial cleaning should be performed around newly friable ACBM and whether additional cleaning is required for materials which remain friable.

Schedule/Begin

Specify a schedule for beginning the recommended response action. You may have to discuss the best time for activities, such as removal, with the designated person.

Schedule/Complete

Specify a schedule for completing the recommended response action. You may need to consult the designated person or a project designer to determine a feasible time frame for certain activities, such as removal.

Date of management planner review

Record the date on which you reviewed the reinspection findings and made the recommendations for response actions.

Management planner name

Clearly print your name.

Management planner signature

Sign your name.

Accreditation #/State

Record your AHERA management planner accreditation number and State of accreditation, if applicable.

Expiration date

Record the expiration date of the accreditation. This date should be later than the date of the reinspection.

Once the recommended response action for each ACBM in each location is recorded, submit reinspection forms to the designated person.

The AHERA designated person fills in the bottom line of Sample Form 2.

I, the LEA's Designated Person, have read and understood the recommendations made above:

Sign Form 2 where indicated as acceptance of the completed reinspection document. Prepare a separate statement indicating your agreement with the recommendations made and the reason(s) for your determination. Provide the LEA's schedule for implementation in this statement.

Date

Date your signature.

Include the completed reinspection forms in each copy of the management plan for the school.

COMPLETED EXAMPLE

Sample Reinspection Form 2. Reinspection of ACBM: Findings and Management Planner Recommendations

School Lafayette Elementary Building Classroom Building 2 Date(s) of Reinspection 10-14-91

Homogeneous Sampling Area: Material Description 1x1 Ceiling Tile ID Number HA-02

REINSPECTION FINDINGS FOR ACBM						MANAGEMENT PLANNER RECOMMENDATIONS		
Location(s) of ACBM by assessment category	Quantity	Friability	Assessment category (1-7, X)	Justification of assessment category	Change in assessment	Preventive measures, response actions, and initial/additional cleanings	Schedule: Begin	Schedule: Complete
Hallway A	1200SF	F / (NF)	X	Encapsulation in good condition- nonfriable	Yes / No	Monitor encapsulant during periodic surveillance and repair any damage observed per O+M procedures.	November 15, 1992	upon removal of all tile from area
Hallway A- North Entry Foyer	20SF	(F) / NF	4	Fingermarks around exit sign - significant damage	Yes / No	Isolate entry area and remove at least 20 damaged tiles following project designer specs.	November 15, 1992	prior to further occupancy
Hallway B	1200SF	(F) / NF	5	This hall does not appear to have been encapsulated in 12/88	Yes / No	Encapsulate tiles following project designer specs. Limit access to K-3 students only.	June 1, 1992	August 1992

Were additional samples of this ACBM collected? Yes (No)

Date of management planner review: 10-21-91

Inspector name Jane Smith

Inspector signature Jane Smith

Accreditation #/State COI123 - Colorado

Expiration date 12-30-91

Management planner name Tom Brown

Management planner signature Tom Brown

Accreditation #/State COM921 - Colorado

Expiration date 1-15-92

I, the LEA's Designated Person, have read and understood the recommendations made above J. B. Williams Date. 11/14/91

APPENDIX D

ANSWERS TO THE MOST FREQUENTLY ASKED QUESTIONS ABOUT REINSPECTIONS UNDER THE AHERA ASBESTOS-IN-SCHOOLS RULE

Answers to the *Most Frequently Asked Questions* About Reinspections

Under the AHERA Asbestos-In-Schools Rule

This document has been prepared in response to the many inquiries that have been received by the Environmental Protection Agency (EPA) concerning the reinspection requirements and related provisions of the Asbestos Hazard Emergency Response Act (AHERA) regulations.

The answers developed here represent the Agency's responses to the most frequently asked questions on this subject. We believe most problem areas have been addressed. However, it is likely that additional questions will occur as the reinspection cycle gets underway. This document is not intended to cover every conceivable query about the reinspection process. It should be used as an adjunct to the AHERA rule for additional clarification of the regulations.

Any questions not answered by this document can be referred to the appropriate Regional Asbestos Coordinator listed on the last page or the EPA Toxics Hotline in Washington, D.C. at 202/554-1404.

Office of Toxics Substances
Office of Pesticides and Toxic Substances
U.S. Environmental Protection Agency
Washington, D.C. 20460

May, 1991

REINSPECTIONS

Questions & Answers

Question 1: *By what date must an LEA have had its school reinspected?*

Answer: Under AHERA, school buildings must be reinspected every three years. The first triennial reinspection must occur within three years after a management plan is in effect [See Section 763.85(b)]. Each LEA was required to develop a management plan no later than May 9, 1989. Implementation of the plan was required to begin by July 9, 1989. Therefore, the first round of three year reinspections must be completed by July 9, 1992.

Question 2: *If implementation of the management plan began prior to July 9, 1989, must the reinspection take place within three years of the actual date the plan was first implemented?*

Answer: YES. The original management plan should have contained reinspection guidelines. These guidelines should have emphasized that as part of implementing the management plan, all reinspection information must be incorporated into the document. If implementation of a management plan began prior to July 9, 1989, the first reinspection should take place within three years of the date the plan was first implemented. However, since implementation of all management plans had to begin no later than July 9, 1989, if the date when implementation first occurred cannot be specifically ascertained, reinspection must take place no later than July 9, 1992.

Question 3: *If a management plan was first implemented on January 10, 1989 and the LEA had a reinspection on January 10, 1992, could the second reinspection date be extended to July 9, 1995, or would it have to be done by January 10, 1995?*

Answer: Section 763.85 (b) requires reinspections to be done "at least once every three years." Therefore, the next triennial reinspection would have to be done on or before January 10, 1995, within three years of the first reinspection.

Question 4: *If the original inspection overlooked some asbestos-containing building materials (ACBM) or if some areas of the building were not accounted for in the first inspection, must the reinspection include the inspection, assessment and documentation of these overlooked areas?*

Answer: NOT REQUIRED by regulation BUT STRONGLY RECOMMENDED BY EPA. While it is not an AHERA requirement, we strongly urge all schools to reinspect those areas or

---

materials in their buildings that may have been overlooked in their initial school inspections.

As a result of an EPA-sponsored AHERA evaluation study and various enforcement activities, it was discovered that, in the original inspections, certain categories of ACBM were frequently missed by inspectors and do not appear in many management plans. Therefore, inspectors conducting reinspections should make sure that materials such as ceiling tile, wallboard, plaster walls, linoleum, fire doors, duct insulation and vibration dampening cloth, which are considered suspect ACBM, are identified and included in the management plan.

The regulations regarding reinspections impose no requirement beyond reinspecting the materials and areas covered in the original inspection, plus any additional materials discovered subsequent to the original inspection; that is, reinspection encompasses "all friable and nonfriable known or assumed ACBM." [Section 763.85(b)(3)(i)]. EPA strongly recommends, however, that the reinspection be thorough so that any deficiencies in the original inspection will be addressed in the reinspection. Any actual or assumed ACBM not previously identified that is discovered during reinspection (or periodic surveillance) should be included in an update to the management plan. The update must include a management planner's recommendations for appropriate response actions based on an accredited inspector's assessment [See Section 763.88(d)].

Question 5: *If the time interval for a 6 month periodic surveillance inspection should coincide with the date for the reinspection, can the reinspection also satisfy the periodic surveillance requirement?*

Answer: YES, since reinspection includes everything that would be covered in the 6 month surveillance.

Question 6: *Is reinspection required for buildings in which no ACBM, known or assumed, was found in the original inspection, or where abatement subsequent to the original AHERA inspection removed all ACBM?*

Answer: NO. Since the AHERA rule confines the reinspection to "all friable and nonfriable known or assumed ACBM," reinspection is not required for buildings which contain no ACBM. However, in accordance with Sections 763.93(d) and (e), management plans should document the asbestos removal as a response action activity in accordance with Sections 763.94(b) and (g); or, if applicable, contain an inspection report or architect's statement that the building is asbestos-free; or that no ACBM was specified in its construction [see Sections 763.99(a)(6) and (7)]. Schools that have conducted asbestos abatement to remove all ACBM should conduct a reinspection in case some ACBM was missed. In addition, LEAs must

---

continue to appoint a "designated person," retain their management plans indefinitely, and provide annual written notification to parent, teacher, and employee organizations of the availability of the plan.

Question 7: *Will areas of newly friable ACBM or assumed ACBM be required to undergo initial cleaning in accordance with Section 763.91?*

Answer: YES. If upon reinspection (or during a periodic surveillance) the condition of ACBM or assumed ACBM has changed from the original AHERA inspection to friable from nonfriable, and the building has not been cleaned since the original inspection, the following requirements as stated in Section 763.91(c)(1) will apply: "Initial cleaning. Unless the building has been cleaned using equivalent methods within the previous 6 months, all areas of a school building where friable ACBM, damaged or significantly damaged thermal system insulation ACM, or friable suspected ACBM assumed to be ACM are present shall be cleaned at least once after the completion of the inspection required by Section 763.85(a) and before the initiation of any response action, other than O & M activities or repair... ."

Question 8: *AHERA requires that an an accredited management planner review the results of each inspection and assessment. Is this also required for reinspections?*

Answer: YES. Section 763.88(d) states that "the local education agency shall select a person accredited to develop management plans to review the results of each inspection, reinspection, and assessment for the school building and to conduct any other necessary activities in order to recommend in writing to the local education agency appropriate response actions."

The review and response action recommendations are particularly important if assessments of known or assumed ACBM have changed from the initial AHERA inspection, or if known or assumed ACBM, previously identified as nonfriable, has become friable.

Question 9: *Must an LEA reinspect a building that is no longer in use as a school?*

Answer: NO. Section 763.85(b)(1) indicates that LEAs shall conduct a reinspection in buildings that they "lease, own, or otherwise use as a school building." However, if the building is not being used as a school at the time its reinspection would have occurred (even if the LEA continues to lease or own the building), the LEA must be able to certify that it is no longer using the building as a school. In addition, if an LEA has stopped using a building as a school, and later decides to use the building as a school, it must be reinspected in accordance with Section 763.85(b).

Question 10: *When must an LEA reinspect a school brought into service after October 12, 1988?*

Answer: Section 763.85(a)(2) requires inspection of schools brought into service after October 12, 1988 prior to use of a building as a school. Section 763.93(a)(3) requires submission of a management plan for such schools to the Governor prior to use of the building. The management plan of a school building brought into service after October 12, 1988 would be in effect 90 days after submission of the plan to the State Governor unless the plan is disapproved. Reinspection must occur within 3 years of the date the plan is in effect, that is, 90 days after submission to the Governor.

Question 11: *What reinspection records must be included in the management plan?*

Answer: In accordance with Section 763.85(b)(3)(vii), the following records must be included:

- The date of the reinspection, the name and signature of the person making the reinspection, State of accreditation, and, if applicable, his or her accreditation number.
- Any changes in the condition of known or assumed ACBM.
- The exact locations where samples were collected during the reinspection, a description of the manner used to determine sampling locations, the name and signature of each accredited inspector who collected the samples, State of accreditation and, if applicable, his or her accreditation number.
- Any assessments or reassessments made of friable material, the name and signature of the accredited inspector making the assessments, State of accreditation, and if applicable, his or her accreditation number.

In addition, the written recommendations of the management planner must be included in the management plan [See Section 763.88(d)].

Question 12: *How should assessments or reassessments made as a result of the reinspection be documented?*

Answer: Sections 763.88(a)(1) and (2) require that the accredited inspector provide a written assessment of all known or assumed friable ACBM in the school building, and submit a copy of the assessment to the designated person within 30 days of the assessment. If there is no change in the material from the initial inspection, the accredited person can simply refer to the initial assessment.

Question 13: *What are the necessary components of an AHERA reinspection?*

Answer: An accredited inspector should visually reinspect and reassess the condition of all known or assumed friable ACBM; visually inspect previously considered nonfriable ACBM and touch it to determine if it has become friable; identify homogeneous areas of material that have become friable since the last inspection; develop required records (detailed in the Answer to Question 11) and submit such records to the LEA's designated person within 30 days of reinspection.

Question 14: *What are the required qualifications for the persons involved in the reinspection?*

Answer: The person conducting the reinspection must be accredited under AHERA as an inspector, and his/her accreditation must be current for the period in which the reinspection takes place. The management planner responsible for the review of the results of the reinspection and recommendations for response actions must be accredited as a management planner under AHERA and his/her accreditation must be current for the period in which the review of the reinspection takes place.

Question 15: *When the management plan is revised as a result of the reinspection, does the updated plan have to be resubmitted to the State?*

Answer: NO. A management plan has to be submitted to the Governor of the State when it is first developed. AHERA does not require subsequent updates or other changes to the plan to be submitted to the State.

APPENDIX E

GLOSSARY OF TERMS

GLOSSARY OF TERMS

ACBM

Asbestos-containing building material, which includes surfacing material, thermal system insulation, or miscellaneous material that is found in or on interior structural members or other parts of a building.

ACBM Condition

Good: No visible damage or deterioration, or showing only very limited damage or deterioration.

Damaged: Physical injury or deterioration such that the internal structure of the material is inadequate, material which has delaminated such that its bond to the substrate is inadequate, or which lacks fiber cohesion or adhesion properties for any other reason. Thermal system insulation (TSI) is considered damaged when it is lacking part or all of its covering. Such damage may be shown by the separation of ACM into layers; flaking, blistering, or crumbling; water damage or stains; scrapes, mars or gouges; exposed TSI beneath its covering.

Significantly Damaged: Damage that is extensive and severe.

Administrator (EPA)

The person appointed by the President to run the EPA.

AHERA

The Asbestos Hazard Emergency Response Act. This Act was signed into law on October 22, 1986 by President Reagan. It established the framework for a regulation which requires, among other things, that elementary and secondary schools identify asbestos-containing materials in school buildings, institute programs aimed at minimizing the risk of asbestos exposure in those buildings, and reinspect those materials at least every 3 years.

AHERA regulation/rule

40 CFR 763, Asbestos-Containing Materials in Schools: Final Rule and Notice, U.S. Environmental Protection Agency, February, 1987.

AHERA 1-7 Categories

Seven categories defined in the AHERA regulations, one of which must be assigned to each friable surfacing and miscellaneous ACBM and each asbestos-containing TSI during an inspection or reinspection.

1. Damaged or significantly damaged TSI ACBM.
2. Damaged friable surfacing ACBM.
3. Significantly damaged friable surfacing ACBM.
4. Damaged or 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.

AHERA Designated Person/Designated Person

Person designated by the Local Education Agency to ensure that the AHERA requirements are properly implemented.

Asbestos

Naturally-occurring fibrous mineral used in many building materials, primarily for fireproofing, thermal system insulation, sound insulation, and decoration.

Asbestos-containing

Any material, when referring to school buildings, which contains more than one percent asbestos.

Assessment

Evaluation of the physical condition and potential for damage of all friable ACBM and asbestos-containing thermal system insulation. AHERA requires classification of each ACBM assessed into one of seven categories based on material type and damage/potential for damage.

Assumed ACBM

Suspect building material that has not been sampled and analyzed for asbestos content and must, therefore, be treated as an ACBM by the LEA.

Bulk Sample

A small portion (usually about thumbnail size) of a suspect asbestos-containing building material collected by the inspector for laboratory analysis to determine asbestos content.

Completed Reinspection	The entire process of the visual examination and assessment of known and assumed ACBM in a school building; recommended response actions by the management planner; and submission of reinspection findings and recommendations to the designated person. Reinspections are required by AHERA every 3 years after management plan implementation.
Current Accreditation	Having successfully completed an EPA-approved accreditation or refresher course within 1 year of the reinspection (for inspectors) or the management plan review (for management planners.)
Encapsulation	Treatment of asbestos-containing material with a liquid that covers the surface with a protective coating or embeds fibers in an adhesive matrix to prevent the release of asbestos fibers.
Enclosure	An airtight, impermeable, permanent barrier around asbestos-containing material to prevent the release of fibers.
EPA	U.S. Environmental Protection Agency.
Evaluation Study	An EPA report entitled **Evaluation of the Asbestos Hazard Emergency Response Act (AHERA)**
Exclusion	One of several situations which permits the LEA to delete one or more of the items required by AHERA. For example, records of previous sample collection and analysis may be used by the accredited inspector in lieu of AHERA bulk sampling.
Exterior Areas	Subdivision of areas of a building with one or more walls open to the outside, such as covered walkways or porticos.

Form

Any document the inspector uses to record information for the reinspection, or for inspection of previously unidentified materials. Two forms were developed for this reinspection guide:

Sample Reinspection Form 1. Original AHERA Inspection Information Abstracted from the Management Plan.

Sample Reinspection Form 2. Reinspection of ACBM: Findings and Management Planner Recommendations.

Friable

When referring to a school building, material that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure. Includes previously nonfriable material after it becomes damaged to the extent that, when dry, it may be crumbled, pulverized, or reduced to powder by hand pressure.

Functional Space

Under AHERA, a room, group of rooms, or homogeneous area designated by a person accredited to prepare management plans, design abatement projects, or conduct response actions.

HEPA

High efficiency particulate air. A special type of filter used in equipment for removing asbestos fibers, e.g., vacuums, air filtration devices.

Homogeneous Sampling Area

In accordance with AHERA definitions, an area of surfacing material, TSI, or miscellaneous material that is uniform in color and texture.

HVAC

Heating, ventilation and air-conditioning systems in a building.

Identified Material

Any AHERA-defined suspect material found during the original AHERA inspection that was also recorded in the management plan for the building.

Local Education Agency (LEA)	An educational agency at the local level that exists primarily to operate schools or to contract for educational services for elementary and secondary public and non-profit private schools. For non-profit private schools, this includes the building owner.
Management Plan	A document that each Local Education Agency is required to prepare under AHERA regulations. It describes all activities planned and undertaken by a school to comply with AHERA regulations, such as building inspections to identify asbestos-containing materials, response actions, and operations and maintenance programs to minimize the risk of exposure to asbestos in school buildings.
Material Category	Broad classification of suspect materials into TSI, surfacing material, and miscellaneous material.
Miscellaneous Material	Interior building material on structural components, such as floor or ceiling tiles. Does not include TSI or surfacing material.
NESHAP	National Emission Standards for Hazardous Air Pollutants, EPA rules under the Clean Air Act.
Nonfriable	Material that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.
Operations and Maintenance Program (O&M)	Program of work practices to maintain friable ACBM in good condition, ensure cleanup of asbestos fibers previously released, and prevent future release by minimizing and controlling friable ACBM disturbance or damage.
Original AHERA Inspection/Original Inspection	Examination of school buildings arranged by Local Education Agency, pursuant to AHERA, to initially identify asbestos-containing materials, evaluate the condition of those materials, and take samples of materials suspected to contain asbestos. Inspections are performed by inspectors accredited by the EPA or by EPA-approved State accreditation programs.

Periodic Surveillance	A visual examination for any change in material condition of ACBM and assumed ACBM in a school building. AHERA requires a periodic surveillance at least once every 6 months.
Previously Unidentified Material	Any AHERA-defined suspect material present in a building at the time of the original AHERA inspection that is not reported in the management plan.
Recorded Location	An area in which a suspect material was present during the inspection, and which is indicated in the management plan as having the material present.
Reinspection	The re-examination, by an accredited inspector, of a school building for which an original AHERA inspection was previously performed, including a re-evaluation and response action recommendations by an accredited management planner. Reinspection of school buildings containing ACBM is required by AHERA regulations at least once every 3 years.
Removal	Taking out or stripping ACBM from an area, a functional space, or a homogeneous area.
Repair	Procedures used to patch or cover damaged asbestos-containing materials, other than enclosure or encapsulation. Examples include covering the damage with plastic sheeting, duct tape, or plaster.
Resilient Sheet Flooring/ Linoleum	A type of floor covering which is preformed in long sheets. Generally, the sheets are unrolled and secured to the floor with an adhesive. These commonly have a vinyl-based upper surface. The backing may contain asbestos.
Response Actions	Methods, including removal, encapsulation, enclosure, repair, and operations and maintenance, that protect human health and the environment from friable ACBM.

Room/Area	A well-defined space within a building, generally a distinct room, but also a hall, crawlspace, or other distinct space. This term may refer to the entire homogeneous sampling area or to a functional space but is generally a subset of these.
School Building	Any structure essential to the operation of a school and under the authority of the LEA, including classrooms, student housing, athletic facilities, administrative areas, garages, and maintenance areas. Several buildings may be present at one school.
Surfacing Material	Material sprayed or troweled onto structural members (beams, columns, or decking) for fire protection; or on ceilings or walls for fireproofing, acoustical or decorative purposes. Includes fireproofing, textured plaster, and other textured wall and ceiling surfaces.
Suspect Material	Building material suspected to contain asbestos because of past practices in its manufacture and use. Includes surfacing material, gypsum wallboard (also called sheetrock or drywall), floor tile, ceiling tile, thermal system insulation, and miscellaneous other materials. Suspect materials are classified as ABCM or non-ACBM by analyzing bulk samples to determine asbestos content.
Total Amount	Estimated amount (in square or linear feet) of suspect material in a building/s at the time of the original AHERA inspection.
TSI	Thermal system insulation. Material in a school 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.
Underestimated Quantity	The difference between the total amount of a suspect material found during the Evaluation Study and the amount of the same material recorded in the management plan, when the latter quantity is less than 80 percent of the former.

Vibration Dampening Cloth (VDC)	Cloth commonly found on ductwork where duct size changes, used to reduce noise.
Wallboard	Generic term for any wall surface installed as sheets, rather than applied wet. Includes gypsum wallboard (also called sheetrock or drywall), transite panels, etc.

APPENDIX F

REFERENCES

REFERENCES

These documents can be obtained from the Toxic Substances Control Act (TSCA) Hotline by calling (202) 554-1404.

USEPA. 1991. U.S. Environmental Protection Agency. *Asbestos in Schools: Evaluation of the Asbestos Hazard Emergency Response Act (AHERA): A Summary Report.* June, 1991.

USEPA. 1990. U.S. Environmental Protection Agency. *Managing Asbestos In Place: A Building Owner's Guide to Operations and Maintenance Programs for Asbestos-Containing Materials.* July, 1990. ("Green Book")

USEPA. 1987. U.S. Environmental Protection Agency. *Asbestos-Containing Materials in Schools: Final Rule and Notice.* 40CFR763. February, 1987.

USEPA. 1988. U.S. Environmental Protection Agency. *100 Commonly Asked Questions about the New AHERA Asbestos-in-Schools Rule*. May, 1988.

USEPA. 1985. U.S. Environmental Protection Agency. *Asbestos in Buildings: Simplified Sampling Scheme for Surfacing Materials.* Washington, DC, EPA 560/5-85-030A. ("Pink Book")

USEPA. 1985. U.S. Environmental Protection Agency. *Guidance for Controlling Asbestos-Containing Materials in Buildings.* Washington, DC, EPA 560/5-85-024. ("Purple Book")

APPENDIX G

PULL-OUT COPIES OF:

1. SAMPLE REINSPECTION FORM 1: ORIGINAL AHERA INSPECTION INFORMATION ABSTRACTED FROM THE MANAGEMENT PLAN

2. SAMPLE REINSPECTION FORM 2: REINSPECTION OF ACBM: FINDINGS AND MANAGEMENT PLANNER RECOMMENDATIONS

3. RECOMMENDED REINSPECTION CHECKLIST FOR THE AHERA DESIGNATED PERSON-PLANNING FOR THE REINSPECTION

4. RECOMMENDED REINSPECTION CHECKLIST FOR THE INSPECTOR

5. RECOMMENDED REINSPECTION CHECKLIST FOR THE MANAGEMENT PLANNER

6. RECOMMENDED REINSPECTION CHECKLIST FOR THE AHERA DESIGNATED PERSON-RECORDKEEPING

7. RECOMMENDED SAMPLE REINSPECTION NOTIFICATION LETTER

Sample Reinspection Form 1. Original AHERA Inspection Information Abstracted from the Management Plan Page _____ of _____

School _____ Building _____ Date(s) of Original AHERA Inspection _____

Homogeneous sampling areas		Material category	Asbestos content	Friability	AHERA assessment category (1-7, X, None)	Recorded locations of material for each assessment category	Response actions taken/ renovations/other comments
ID number	Material description						
		TSI Surf. Misc.	Assumed Yes No	F NF X			
		TSI Surf. Misc.	Assumed Yes No	F NF X			
		TSI Surf. Misc.	Assumed Yes No	F NF X			
		TSI Surf. Misc.	Assumed Yes No	F NF X			
		TSI Surf. Misc.	Assumed Yes No	F NF X			
		TSI Surf. Misc.	Assumed Yes No	F NF X			

Information abstracted by _____ Date _____

Friability: F = friable, NF = nonfriable, X = not applicable (material is non-ACBM)

AHERA assessment category: 1 = Damaged or significantly damaged TSI ACBM, 2 = Damaged friable surfacing ACBM, 3 = Significantly damaged friable surfacing ACBM, 4 = Damaged or 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, X = not applicable (material is non-ACBM or nonfriable surfacing or miscellaneous material), None = No assessment category provided in original inspection.

Sample Reinspection Form 2. Reinspection of ACBM: Findings and Management Planner Recommendations

School _____ Building _____ Date(s) of Reinspection _____

Homogeneous Sampling Area: Material Description _____ ID Number _____

REINSPECTION FINDINGS FOR ACBM						MANAGEMENT PLANNER RECOMMENDATIONS		
Location(s) of ACBM by assessment category	Quantity	Friability	Assessment category (1-7, X)	Justification of assessment category	Change in assessment	Preventive measures, response actions, and initial/additional cleanings	Schedule	
							Begin	Complete
		F NF			Yes No			
		F NF			Yes No			
		F NF			Yes No			
Were additional samples of this ACBM collected? Yes No						Date of management planner review: _____		
Inspector name _____ Inspector signature _____ Accreditation #/State _____ Expiration date _____						Management planner name _____ Management planner signature _____ Accreditation #/State _____ Expiration date _____		
I, the LEA's Designated Person, have read and understood the recommendations made above: _____ Date: _____								

Recommended Reinspection Checklist for the AHERA Designated Person-Planning for the Reinspection

- ☐ 1. Select the inspector(s) and management planner to perform reinspection activities; obtain proof of their current accreditations.

- ☐ 2. Determine the scope of work.
  - ☐ 2a. Clarify which buildings are to be included in the reinspection. Determine whether each building is used as a school building.
  - ☐ 2b. Determine whether previously grouped, similar materials (e.g., all floor tile) should be separated into distinct materials.
  - ☐ 2c. Determine whether previously assumed ACBM should be bulk sampled. Determine whether other bulk samples should be collected.
  - ☐ 2d. Determine whether quantities of ACBM should be re-estimated.
  - ☐ 2e. Determine whether the inspector should look for previously unidentified suspect materials. (Highly recommended by the EPA.)

- ☐ 3. Determine how the reinspection results will be reported.
  - ☐ 3a. Determine whether locations of ACBM should be reported on a room-by-room basis, rather than by a building or homogeneous sampling area basis.
  - ☐ 3b. Determine whether a floorplan or written description, or both, will be used to locate ACBM.
  - ☐ 3c. Determine whether ACBM will be assessed on a room by room, homogeneous sampling area, or some other basis.
  - ☐ 3d. Determine whether photographs or videotape will be used to document material condition.

Recommended Reinspection Checklist for the Inspector

Planning for the reinspection field activities

- ☐ 1. **Review the items on the Reinspection Checklist for the AHERA Designated Person - Planning for the Reinspection.**
- ☐ 2. **Select the field forms to be used (reinspection, reassessment, inspection, bulk sample logs, photograph logs, chain of custody, floorplans).**
- ☐ 3. **Review the management plan for the school (see Sample Reinspection Form 1 in Appendix B).**
  - ☐ 3a. **Obtain or generate a list of all ACBMs and non-ACBMs (and associated identification numbers, if provided) and material categories reported during the original inspection.**
  - ☐ 3b. **Record the sample results for each homogeneous sampling area of suspect material.**
  - ☐ 3c. **Record all reported locations of material (descriptions and/or location diagrams) for each homogeneous sampling area.**
  - ☐ 3d. **Copy the location diagrams, if possible.**
  - ☐ 3e. **Record the original inspection assessment category assigned to ACBM in each room/area.**
  - ☐ 3f. **Record any response actions which have occurred and the location of each.**
  - ☐ 3g. **Record any renovations which have occurred and the location of each.**
  - ☐ 3h. **Review records of periodic surveillance.**
- ☐ 4. **Arrange administrative details - time of inspection, school escort, and keys.**
- ☐ 5. **Assemble all field materials.**
  - ☐ 5a. **A supply of all field forms, pens, calculator, tape measure, flashlight, and tools.**
  - ☐ 5b. **Blank floorplans and inspection location diagrams, if available.**
  - ☐ 5c. **Bulk sample collection tools and clean-up supplies, if required.**
  - ☐ 5d. **Personal protective equipment, if needed.**
  - ☐ 5e. **A ladder, if needed.**

Recommended Reinspection Checklist for the Inspector (Continued)

Performing the field activities

- ☐ 6. **Meet the school escort.**
- ☐ 7. **Select the first room/area to be reinspected.**
- ☐ 8. **Observe and record each ACBM in the selected room/area, referring to the list of homogeneous areas of ACBM and non-ACBM abstracted from the management plan (see Sample Reinspection Form 2).**
- ☐ 9. **Mark the rooms/areas where each ACBM was observed on the diagram or floorplan (optional).**
- ☐ 10. **Re-estimate the quantity of each ACBM in the selected room/area (if requested by the designated person).**
- ☐ 11. **Touch each ACBM in the room/area to determine whether it is friable.**
- ☐ 12. **Collect additional bulk samples, as instructed by the designated person.**
- ☐ 13. **Look at the condition and determine the potential for damage or significant damage to each friable ACBM and asbestos-containing TSI in the room/area.**
- ☐ 14. **Assign a reassessment category to each friable ACBM and asbestos-containing TSI in the room/area.**
- ☐ 15. **Record the justification of the assigned reassessment category (can use assessment form or notes).**
- ☐ 16. **Photograph the material, if requested by the designated person.**
- ☐ 17. **Assess previously unidentified materials in the room/area, if requested by the designated person.**
- ☐ 18. **Move to next room/area, and repeat as above.**

Recordkeeping

- ☐ 19. **Complete all field form data items.**
- ☐ 20. **Record name, signature, date, and accreditation number and State (if applicable) on the reinspection form.**

Recommended Reinspection Checklist for the Inspector (Continued)

Recordkeeping (continued)

☐ 21. **If additional bulk samples were collected, include the exact locations where they were taken. Also include a description of the process used to select sample locations, and the name, signature, date, and accreditation number and State (if applicable) of the inspector(s) collecting each bulk sample in each copy of the school's management plan.**

☐ 22. **Submit the results of the reinspection to the AHERA designated person within 30 days after the reinspection is completed. Note, at a minimum, any changes in ACBM assessment.**

Recommended Reinspection Checklist for the Management Planner

Recommendations for response actions

- ☐ 1. **Review the results of the original AHERA inspection, periodic surveillance records, and the reinspection.**
- ☐ 2. **Visit the school or take other necessary actions to recommend response actions to the LEA.**
- ☐ 3. **For each friable surfacing and miscellaneous ACBM and each asbestos-containing TSI reported by the inspector, make written response action recommendations.**
  - ☐ 3a. **Describe preventive measures and response actions for each assessment location of the ACBM.**
  - ☐ 3b. **Consider whether cleaning in accordance with procedures in 40CFR763.91(c) should be performed in each area and make appropriate recommendations in writing.**
- ☐ 4. **Include a schedule for beginning and completing the recommended cleaning and response actions.**
- ☐ 5. **Estimate the resource requirements for the recommended response actions.**
- ☐ 6. **Review the adequacy of the O&M Plan.**

Recordkeeping

- ☐ 7. **Record name, signature, date, and accreditation number and State (if applicable) on the reinspection form.**
- ☐ 8. **Submit written recommendations for the response actions to the designated person.**

Recommended Reinspection Checklist for the AHERA Designated Person - Recordkeeping

- ☐ 1. Include the reinspection report and recommended response actions in each copy of the school's management plan.
- ☐ 2. Include a written statement indicating agreement or disagreement with the management planner's recommendations for response actions, justification for any disagreement, and an implementation schedule for the response actions in the management plan. (Recommended by the EPA.)
- ☐ 3. Include inspection report findings for any previously unidentified materials (and, if ACBM found, include management planner recommendations) in the management plan.
- ☐ 4. Include a copy of a document describing steps taken to inform workers and building occupants, or their legal guardians, about the reinspection in each copy of the school's management plan.
- ☐ 5. Evaluate the effectiveness of the asbestos operations and maintenance (O&M) program and periodic surveillance. Revise, as appropriate.

Recommended Sample Reinspection Notification Letter

EASTSIDE COMMUNITY PUBLIC SCHOOLS

East Park Avenue
Eastside, CA 91005
(999) 922-3333

Bob Smith, Superintendent

Notification of Asbestos Reinspections

TO: Parents and Staff of Eastside Middle School

FROM: Bob Smith, Superintendent of Schools

DATE: December 15, 1991

In compliance with the U.S. Environmental Protection Agency (EPA) Asbestos Hazard Emergency Response Act (AHERA), in the fall of 1988 we performed inspections of each of our school buildings for asbestos-containing building materials. The inspection findings and asbestos management plans have been on file in each school administrative office since that time.

The EPA requires us to perform reinspections of the asbestos materials every three years. During the months of September through November 1991, accredited asbestos inspectors performed these reinspections. An accredited management planner reviewed the results of the reinspections and recommended actions we should take to safely manage each asbestos material in our buildings.

Two significant findings were noted during the reinspection of Eastside Middle School:

- Asbestos-containing water pipe insulation in the kitchen over the dishwasher is slowly deteriorating due to high humidity. The material is scheduled for removal over the Christmas break.

- Linoleum in all bathrooms was not included in the original AHERA inspection. The backing (between the vinyl layer and the floor) is assumed to contain asbestos. The vinyl layer is in good condition and provides an effective barrier, preventing asbestos fiber release. This material has been added to our asbestos maintenance program and we will monitor it for any changes in condition.

All other asbestos materials in this school are in good condition and we will continue to manage them in place, as recommended by the accredited management planner.

The results of the reinspection are on file in the management plan in the school's administrative office. Everyone is welcome to view these anytime during normal school hours (M-F, 8:00 a.m. - 4:30 p.m.). The Asbestos Program Manager, Jill Williams, is available to answer any questions you may have about asbestos in our buildings at (999) 922-3334.

APPENDIX H

MESSAGE FROM THE ADMINISTRATOR OF EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 6 1991

THE ADMINISTRATOR

An Advisory to the Public on Asbestos in Buildings:

The Facts About Asbestos in Buildings

In recent months, there have been a number of scientific and news reports about asbestos in buildings. Unfortunately, some of these may have confused, rather than enlightened, the public about the potential health risks of asbestos exposure and the Environmental Protection Agency's (EPA) policies regarding asbestos in schools and other buildings.

I want to summarize the EPA's policies for asbestos control in schools and other buildings. I am providing this summary in the form of five major facts that the Agency has presented in congressional testimony.

FACT ONE: Although asbestos is hazardous, human risk of asbestos disease depends upon exposure.

Asbestos is known to cause cancer and other diseases if asbestos fibers are inhaled into the lung and remain there. This conclusion is based upon studies involving human exposure, particularly exposure at high levels. A recent Science magazine article indicated exposure to chrysotile (common "white" asbestos) may be less likely to cause some asbestos-related diseases. Although there is more evidence of hazard for some types of asbestos, EPA believes there is reason to be concerned about other types, such as chrysotile, for which the data are less conclusive. Based on careful evaluation of available scientific evidence, EPA has adopted a prudent approach in its regulations of assuming that all fibers are of equal concern. Various scientific and regulatory organizations, including the National Academy of Sciences, support EPA's more protective regulatory approach.

It is important to stress that the mere presence of a hazardous substance, such as asbestos on an auditorium ceiling, no more implies that an asbestos-related disease will develop than a poisonous substance in a medicine cabinet or under a kitchen sink implies that a poisoning will occur. Asbestos fibers must be released from the material in which they are contained, and an individual must breathe those fibers in order to incur any chance of disease.

Printed on Recycled Paper

While scientists have been unable to agree on a level of asbestos exposure at which we, as public policy makers, can confidently say, "there is no risk," this does not mean that all or any exposure is inherently dangerous. To the contrary, almost every day we are exposed to some level of asbestos fibers in buildings or in the outdoor air. Based upon available data, very few among us, given existing regulatory controls, have contracted or will ever contract an asbestos-related disease from these relatively low levels of airborne fibers found in buildings. The present scientific evidence will not allow us to state unequivocally that there is a level of exposure below which there is a zero risk, but the risk at these low levels in fact could be negligible or even zero. The risks of asbestos disease can be higher from exposures that occur during mining, manufacturing, and use of some remaining asbestos products, for example, in the repair of automotive brakes.

FACT TWO: **Prevailing asbestos levels in buildings** -- the levels that school children and you and I face as building occupants -- **seem to be very low**, based upon available data. **Accordingly, the health risk we face as building occupants also appears to be very low.**

Indeed, a 1987 EPA study found that airborne fiber levels in a segment of Federal buildings with asbestos management programs were so low that the levels were in a range comparable to levels outside these buildings. While the data are not conclusive and we are seeking more information through a major research effort, the 1987 study appears to suggest that building occupants face only a minimal risk when their buildings have active asbestos management programs. Severe health problems attributed to asbestos exposure have generally been experienced by workers in industries such as shipbuilding, where they were constantly exposed to very high fiber levels in the air, often without any of the worker protections now afforded to them under the law. Of course, some building workers, if they are not properly trained and protected, may disturb asbestos-containing materials and, in so doing, increase the risk to themselves and others.

FACT THREE: **Removal is often not a school district's or other building owner's best course of action to reduce asbestos exposure.** In fact, an improper removal can create a dangerous situation where none previously existed.

It is important to understand that, for most situations, EPA's asbestos regulations for schools under the Asbestos Hazard Emergency Response Act (AHERA) do not require removal of asbestos. These regulations allow the school to decide whether asbestos removal, or some other response action, is the best option to protect the health of school students and employees. In general, asbestos removal is most appropriate when asbestos materials, such as pipe or boiler insulation, are damaged beyond repair.

Although we believe most asbestos removals are being conducted properly, asbestos removal practices by their very nature disturb the material and significantly elevate airborne fiber levels. Unless all safeguards are properly applied and strictly followed, exposure in the building can rise, perhaps to levels where we know disease can occur. Consequently, an ill-conceived or poorly conducted removal project can actually increase rather than eliminate risk.

FACT FOUR: EPA only requires asbestos removal in order to prevent significant public exposure to asbestos, such as during building renovation or demolition.

Prior to a major renovation or demolition, asbestos material that is likely to be disturbed or damaged to the extent that significant amounts of asbestos would be released must be removed using approved practices under EPA's asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP) regulation. Demolishing a building containing large amounts of asbestos, for example, would likely result in significantly increased exposure and could create an imminent hazard. Clearly, asbestos removal before the wrecking ball swings into action is appropriate to protect public health. However, this cannot be said of arbitrary asbestos removal projects, which, as noted above, can actually increase health risk unless properly performed. This, in part, is why EPA has not mandated asbestos removal from schools or other buildings beyond the NESHAP requirement, which has the effect of gradually and rationally taking all remaining asbestos building materials out of the inventory.

FACT FIVE: EPA does recommend in-place management whenever asbestos is discovered.

Instead of removal, a conscientious **in-place management program** will usually control fiber releases, particularly when the materials are not significantly damaged and are not likely to be disturbed. That is why Congress mandated such a program in schools through AHERA.

In-place management, of course, does not mean "do nothing." It means, first, that the building owner or manager should identify asbestos, through a building-wide inventory or on a case-by-case basis before suspect materials are disturbed by renovations or other actions. The AHERA program requires an inventory of all asbestos materials in schools by properly accredited individuals.

After the material is identified, the school's personnel, building owner or manager can then institute controls to ensure that the day-to-day management of the building is carried out in a manner that prevents or minimizes the release of asbestos fibers into the air. These controls will ensure that when asbestos fibers are released, either accidentally or intentionally, proper management and cleanup procedures are implemented.

Another concern of EPA and other Federal, State and local agencies which regulate asbestos is to ensure proper worker training and protection. Maintenance and service workers in buildings, in the course of their daily activities, may disturb materials and can thereby elevate asbestos fiber levels, especially for themselves, if they are not properly trained and protected. For these persons, risk may be significantly higher than for other building occupants. Proper worker training and protection, as part of an active in-place management program, can reduce any unnecessary asbestos exposure for these workers and others. AHERA requires this training for school employees whose job activities may result in asbestos disturbances.

In addition to the steps outlined above, an in-place management program will usually include notification to workers and occupants of the existence of asbestos in their building, periodic surveillance of the material, and proper recordkeeping. EPA requires all of these activities for schools and strongly recommends that other building owners also establish comprehensive asbestos management programs. Without such programs, asbestos materials could be damaged or deteriorate, which may result in elevated levels of airborne asbestos fibers.

While the management costs of all the above activities will depend upon the amount, condition, and location of the materials, such a program need not be expensive. In many instances, an in-place management program may be all that is necessary to control the release of asbestos fibers, until the asbestos-containing material in a building is scheduled for removal because of renovation or demolition activities.

In summary, EPA's best advice on asbestos is neither to rip it all out in a panic nor to ignore the problem under the false presumption that asbestos is "risk free." Rather, we recommend a practical approach that protects public health by emphasizing that asbestos material in buildings should be located, that it should be appropriately managed, and that those workers who may disturb it should be properly trained and protected. That has been, and continues to be, EPA's position.

If you have questions or need additional information about asbestos in schools and other buildings, please call EPA's Toxics Hotline at (202) 554-1404 or write the Environmental Assistance Division (TS-799), Office of Pesticides and Toxics Substances, 401 M Street, Washington, DC 20460.

Sincerely,

William K. Reilly

William K. Reilly

AHERA EVALUATION FACT SHEET

FINDINGS AND IMPLICATIONS FOR SCHOOLS

The U.S. Environmental Protection Agency (EPA) recently completed an evaluation of the Asbestos Hazard Emergency Response Act (AHERA) regulatory program in schools. The evaluation focused on how well the schools implemented key aspects of AHERA and the factors that affected implementation. The evaluation fulfills a commitment to Congress to study the AHERA program to determine which elements of the statute, if any, could be used in a possible future program for public and commercial buildings. However, the sole purpose of this fact sheet is to inform schools of their initial AHERA successes, note areas for improvement, and provide additional guidance.

The evaluation was based on data gathered in a national statistical sample of 30 communities and 198 schools. Each school was visited and thoroughly reinspected. In-person interviews were conducted with each principal and AHERA-designated person. In addition, telephone interviews were held with the original AHERA inspector, the head of the PTA (or other active parent), and an active teacher in the school. In order to supplement the statistical data collected, focus group discussions were held in communities nationwide that were not associated with the original sample. Four focus groups were held with parents and teachers, and five others were held with school maintenance and custodial workers. The evaluation concentrated on six elements of AHERA: **school building reinspection, management plans, response actions, overall AHERA inspection reports, notification, and maintenance and custodial worker training.**

This fact sheet lists the key findings of the AHERA evaluation and provides some general follow up recommendations for schools. The fact sheet also provides "Know This!" sections that define terms which were identified by the Management Plan Evaluation as often misused. Information on materials which provided specific guidance to local education agencies (LEAs) on how to address possible deficiencies in the original inspection reports and management plans can be found at the end of this document.

SCHOOL BUILDING REINSPECTION

FINDINGS:

- An estimated 89 percent of the total quantity of suspect asbestos-containing building materials (ACBM) reinspected in the evaluation was identified in the original AHERA inspection.

- Eighty-two percent of the school buildings had at least one material unidentified. The suspect materials missed most frequently were fire doors, duct insulation, linoleum, and vibration dampening cloth in air ducts. Although wallboard was not a part of the survey, EPA believes this is another suspect ACBM that was often missed in the initial AHERA inspection.

- Only 56 percent of the areas where ACBM was identified had the exact location recorded in the management plan.

- Ninety-two percent of the ACBM which should have been assessed according to AHERA was actually assessed. Forty-four percent of the ACBM assessed used AHERA categories reporting the amount of damage at the time of inspection as well as the potential for damage.

WHAT THIS MEANS TO YOU:

The identification and location of suspect material is crucial to the management of asbestos. The upcoming three-year reinspection, required for all schools by July 9, 1992, is an opportunity for schools to have the original inspection report reviewed and corrected, should there be deficiencies in the identification and assessment of ACBM. Below are the steps EPA recommends to address possible deficiencies.

- The LEA designated person should review the inspection report and management plan carefully to determine if the categories of frequently missed materials were identified.

- You may want the inspector who performs the three-year reinspection to look for possible missed suspect material. Inspectors should make sure that materials such as ceiling tile, wallboard, plaster walls, linoleum, fire doors, duct insulation and vibration dampening cloth are identified and recorded in the management plan.

- The LEA designated person should review information on each material identified to ensure its specific location is recorded.

- The inspector should provide additional information about the location of previously identified ACBM if it is not included in the management plan.

KNOW THIS!

Suspect materials are generally divided into three broad categories:

1) thermal system insulation (TSI), such as pipe or boiler wrap;
2) surfacing materials, such as sprayed on ceiling materials or fireproofing; and
3) miscellaneous, which includes floor tiles and fire doors.

MANAGEMENT PLANS

FINDINGS:

- Management plans were generally complete. However, in many instances, the location of homogeneous areas was not clearly described and the material was insufficiently identified as TSI, surfacing materials, or miscellaneous.

- Plans, while generally complete, were not "user friendly" or easy to understand. Almost one quarter of the plans were difficult to follow without specialized instruction.

WHAT THIS MEANS TO YOU:

The management plan is the basis for all asbestos work done in the school and is a guide for anyone who could disturb the ACBM during maintenance or custodial work. It should be reviewed for clarity and usability and continually updated to reflect all asbestos activities.

KNOW THIS!

- Homogeneous Area: an area of surfacing material, TSI or miscellaneous material that is uniform in color and texture.
- Functional Space: a room, group of rooms, or homogeneous area designated by a person accredited to prepare Management Plans, design abatement projects, or conduct response actions.

RESPONSE ACTIONS

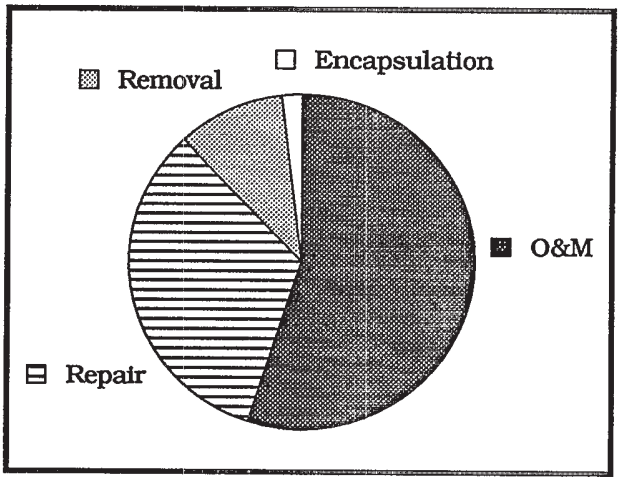
FINDINGS:

- Seventy-one percent of the management plans included recommendations for response actions such as operations and maintenance (O&M), repair, encapsulation, and removal; fifty-five percent of those recommendations called for O&M techniques while 10 percent called for removals.

- Asbestos was removed in 15 percent of the school buildings where response actions were completed.

- Ninety-eight percent of the recommended response actions were in accordance with AHERA guidelines. However, 80 percent of the buildings had recommendations that were considered generic because of a failure to specify exactly where the response action should be performed.

Plannned Response Actions



- The majority of prior remediations were judged to be adequate.

WHAT THIS MEANS TO YOU:

All friable ACBM should have an appropriate response action associated with it. To ensure your management plan has an appropriate response action, EPA recommends:

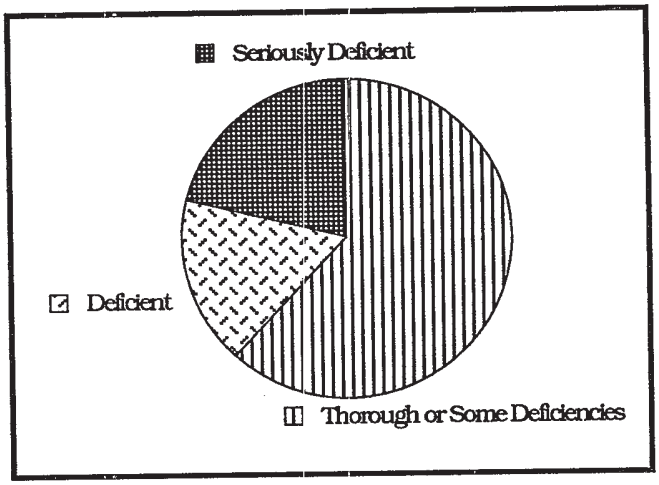
- ❑ The LEA designated person should check their management plan for a clear match between friable ACBM and recommended response action.
- ❑ If there appear to be deficiencies, an accredited management planner should review the inspection report and document recommended response actions.
- ❑ LEAs may want to address this when an accredited management planner reviews the reinspection report.

ORIGINAL AHERA INSPECTIONS

FINDINGS:

- ❑ Thirty-eight percent of the inspections were found to be either deficient or seriously deficient. The primary causes of deficient inspections were failure to identify all suspect material in a school, failure to clearly record the precise locations of ACBM, and failure to quantify it within acceptable standards of accuracy.

Level of School Inspection Thoroughness



WHAT THIS MEANS TO YOU:

It is important that school officials be aware of the asbestos (or suspect ACM) in their buildings and that the locations and amounts of ACBM are accurately recorded and marked. Without this information, a school cannot effectively manage its asbestos. Those who may come into direct contact with the material, such as custodians, maintenance personnel and short-term workers, may inadvertently disturb the material if they are unaware of its location.

Although only known or assumed ACBM is required to be reinspected in the triennial reinspections, EPA recommends schools take this opportunity to inspect for materials that may have been overlooked in the initial inspection (frequently missed materials are listed on this fact sheet under school building reinspection). It is also a good time for the inspector to correct deficiencies regarding unrecorded locations or unquantified amounts of ACBM.

NOTIFICATION PROCESS

FINDINGS:

- ❑ A survey of school principals showed that parents and teachers did not appear to overreact

upon learning about the presence of asbestos in their schools (overreacting can sometimes lead to improper or poorly conducted removals). In the focus group discussion, some parents and teachers did not recall receiving the notification.

WHAT THIS MEANS TO YOU:

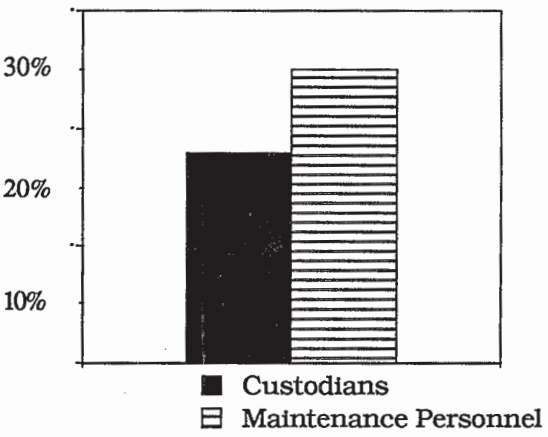
As required by AHERA, schools should continue to send the annual notifications including information on planned response actions and reinspections. Copies of notifications should be kept in your management plan.

MAINTENANCE & CUSTODIAL WORKER TRAINING & EXPERIENCE

FINDINGS:

- Eighty-seven percent of schools provided maintenance workers with asbestos-related training while 7 percent offered no training (approximately 6 percent do not have maintenance workers). Ninety-five percent of schools conducted classes that met the two-hour awareness training for custodial workers required by AHERA. Only 22 percent of schools that trained their maintenance workers provided 16 or more hours of training, as required by law, for those employees who may disturb asbestos.

Percent of Training Which Did Not Describe the Location of ACBM



- During maintenance-worker training, 25 percent of schools did not describe the locations of ACBM in their buildings. Classes for custodial workers included the locations in all but 18 percent of the schools.

- According to discussions with some custodial and maintenance workers, frequent unprotected and inappropriate work practices occur in schools. Often, workers did not perceive everyday tasks as disturbing asbestos, unless the asbestos was sawed, cut, or in some other way visibly damaged.

WHAT THIS MEANS TO YOU:

It is important that schools train custodial and maintenance workers appropriately. It is the LEA's responsibility to ensure that:

- all maintenance and custodial workers who work in school buildings with ACBM receive at least 2 hours of awareness training;

- specific locations of ACBM in each building are included in the two-hour training;

- all maintenance and custodial workers who may disturb ACBM receive an additional 14 hours of training;

- ❑ the 16-hour training includes hands-on training in the use of respiratory protection and good work practices; and

- ❑ newly hired custodial and maintenance workers are trained within 60 days.

GENERAL INFORMATION

LEAs need to be aware of these AHERA evaluation findings, build upon their successes, and work toward improving deficiencies. To assist the schools with this effort, EPA has available guidance materials and activities that address the concerns raised in the evaluation:

- ❑ EPA has published its Green Book, *Managing Asbestos In Place*, which has been mailed to schools. If you require an additional copy, call the EPA asbestos hotline at (202) 554-1404.

- ❑ Seminars on the Green Book's in-place management guidance were conducted for school officials around the country earlier this year.

- ❑ An AHERA questions-and-answers document was distributed late last month to help schools plan and conduct the three-year reinspections required by AHERA.

- ❑ EPA is now preparing model training materials, which should be available in autumn, for the 16-hour AHERA maintenance training requirement.

- ❑ The Agency is developing, with the National Institute of Building Sciences, an operations and maintenance manual for custodial and maintenance workers who come in contact with ACM. The manual, enlarging upon the Green Book's in-place management guidance, is scheduled to be completed by the end of 1991.

- ❑ EPA is revising the model accreditation plan which specifies training and certification requirements for asbestos control professionals working in schools.

- ❑ The Agency is also planning an AHERA self-study guide for school "designated persons" planned for spring 1992.

- ❑ Additional detailed guidance on how to conduct an AHERA reinspection is set for distribution later this year.

LEAs will be notified when the new guidance materials are available.

To obtain a report on the AHERA evaluation, or other asbestos guidance, contact the EPA asbestos hotline at (202) 554-1404.

July 1991

obligation subjects the provider to exclusion as a participating provider.

(c)i*General rule for payment and administration.* Subject to the special rules and procedures in paragraph (d) of this section and the waiver authority in paragraph (e) of this section, as a general rule the provisions of § 199.14 shall govern payment and administration of claims under the supplemental care program as they do claims under CHAMPUS. To the extent necessary to interpret or implement the provisions of § 199.14, related provisions of this parti shall also be applicable.i

(d)i*Special rules and procedures.* Asi exceptions to the general rule in paragraph (c) of this section, the special rules and procedures in this section shall govern payment and administration of claims under the supplemental care program. These special rules and procedures are subject to the waiver authority of paragraph (e) of this section.

* * * * *

(2)iPreauthorization by the uniformedi services of each service, except for services in cases of medical emergency (for which the definition in § 199.2 shall apply), is required for the supplemental care program. It is the responsibility of the active duty members to obtain preauthorization for each service. With respect to each emergency inpatient admission, after such time as the emergency condition is addressed, authorization for any proposed continued stay must be obtained within two working days of admission.

(3)iWith respect to the filing of claimsi and similar administrative matters for which this part refers to activities of the CHAMPUS fiscal intermediaries, for purposes of the supplemental care program, responsibilities for claims processing, payment and some other administrative matters may be assigned by the Director, OCHAMPUS to the same fiscal intermediaries, other contractor, or to the nearest military medical treatment facility or medical claims office.

(4)iThe annual cost pass-throughs fori capital and direct medical education costs that are available under the CHAMPUS DRG-based payment system are also available, upon request, under the supplemental care program. To obtain payment include the number of active duty bed days as a separate line item on the annual request to the CHAMPUS fiscal intermediaries.

(5)iFor providers other thani participating providers, the Director, OCHAMPUS may authorize payment in excess of CHAMPUS allowable amounts. No provider may bill an active duty member any amount in excess of the CHAMPUS allowable amount.i

(e) *Waiver authority.* With thei exception of statutory requirements, anyi restrictions or limitations pursuant to i the general rule in paragraph (c) of thisi section, and special rules andi procedures in paragraph (d) of thisi section, may be waived by the Director,i OCHAMPUS, at the request of ani authorized official of the uniformedi service concerned, based on ai determination that such waiver isi necessary to assure adequate availabilityi of health care services to active dutyi members.i

(f) *Authorities.* * * *

(3)iThe Director, OCHAMPUS shalli issue procedural requirements for the implementation of this section, including requirement for claims submission similar to those established by § 199.7.

Dated: October 28, 1993.

L.M. Bynum,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 93–27050 Filed 11–4–93; 8:45 am]

BILLING CODE 5000–04–M

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 763

[OPPTS–62114A; FRL–4635–7]

Asbestos, Manufacture, Importation, Processing and Distribution Prohibitions

AGENCY: Environmental Protection Agency (EPA).

ACTION: Continuing restrictions on certain asbestos-containing products.

SUMMARY: EPA is announcing its factual determinations concerning the regulatory status of asbestos-containing product categories originally banned in the Asbestos Ban and Phaseout Rule. The United States Court of Appeals for the Fifth Circuit (the "Court") vacated and remanded most of the rule which prohibited the future manufacture, importation, processing, and distribution in commerce of certain asbestos-containing products, and required the labeling of those products in the interim. In a subsequent clarification, the Court noted that the rule continued to govern asbestos-containing products that were not being manufactured, imported, or processed on July 12, 1989. EPA has concluded that six asbestos-containing product categories were not being manufactured, processed, or imported on July 12, 1989, and thus are still subject to the rule. The remaining product categories were being manufactured, processed, or imported on July 12, 1989, and are no longer subject to the rule. In the near future EPA will publish a technical amendment to 40 CFR part 763 to bring it in line with the Court's ruling.

FOR FURTHER INFORMATION CONTACT: For general information contact: Susan B. Hazen, Director, Environmental Assistance Division (7408), Office of Pollution Prevention and Toxics,i Environmental Protection Agency, 401i M St., SW., Washington, DC 20460,i Telephone: (202) 554–1404, TDD: (202)i 554–0551. For technical informationi contact: Mike Mattheisen, Chemicali Management Division (7404), Office ofi Pollution Prevention and Toxics,i Environmental Protection Agency, 401i M St., SW., Washington, DC 20460,i Telephone: (202) 260–1866.i

SUPPLEMENTARY INFORMATION:i

I.iBackgroundi

In the **Federal Register** of July 12,i 1989 (54 FR 29460), EPA issued a final rule under section 6 of the Toxic Substances Control Act (TSCA), 15 U.S.C. 2605. The rule prohibited, at staged intervals, the future manufacture, importation, processing, and distribution in commerce of almost all asbestos-containing products, and required labeling of such products in the interim (40 CFR 763.160 through 763.179). The first stage of the ban regulated any "new uses of asbestos," and certain specifically identified asbestos-containing products. "New iuses of asbestos" means thosei commercial uses of asbestos noti identified in 40 CFR 763.165, and noti excluded specifically by the definition,i the manufacture, importation, or processing of which would be initiatedi for the first time after August 25, 1989i (40 CFR 763.163). After August 27,i 1990, the rule banned the manufacture,i importation, and processing of all stagei one products, and required that thosei products be labeled while theyi remained in distribution (40 CFRi 763.165(a), 763.167(a), and 763.171(a)).i After August 27, 1992, the rule alsoi prohibited the distribution in commercei of all stage one products (40 CFRi 763.169(a)). The second and third stagesi of the ban regulated additional types ofi asbestos-containing products. These twoi later stages of the rule containedi provisions that were comparable to thei first stage, but that were to take effecti from 1992 through 1997 (40 CFRi 763.165(b) through (e), 763.167(b) andi (c), 763.169(b) through (d), andi 763.171(b) and (c)).i

HeinOnline -- 58 Fed. Reg. 58964 1993

On October 18, 1991, the United States Court of Appeals for the Fifth Circuit vacated and remanded most of the rule (*Corrosion Proof Fittings v. EPA*, 947 F.2d 1201 (5th Cir., 1991)). The Court agreed with EPA's determination that asbestos is hazardous and presents similar risks throughout different industries. It also affirmed EPA's authority to issue rules that ban all uses of a toxic substance under TSCA. The Court, however, held that parts of the rule were not supported by substantial evidence because EPA failed to sustain its burden under TSCA section 6(a) of showing that the products banned by the rule present an unreasonable risk, and that a less burdensome regulation would not adequately protect against that risk. The Court also found that EPA failed to give adequate notice and opportunity to comment on the use of analogous exposure data to support some parts of the rule.

Although the Court vacated and remanded most of the rule, it left intact the portion of the rule that regulates products that were not being manufactured, produced, or imported when the rule was published on July 12, 1989. The Court concluded that it "will not disturb the agency's decision to ban products that no longer are being produced in or imported into the United States." *Id.* at 1229. In arriving at this decision, the Court found that TSCA gave EPA the general authority to ban future uses of asbestos. Moreover, the Court determined that EPA properly evaluated the benefits and risks of banning such products when it promulgated the rule. Petitioners had argued that the benefits outweighed the risks because the benefits of a product that is not being produced is more than zero, in that it may find a future use, while the estimated risk is zero. The Court noted, however, that this balance would soon change when the product returned to the marketplace. As a result, the Court found "it was not error on the part of the EPA" to ban products that "temporarily show[ed] no risk because they were not part of this country's present stream of commerce." *Id.* Even if some future use should arise for these products, the Court noted, manufacturers and importers have access to the waiver provisions in the rule. *Id.* Finally, the Court explicitly rejected Petitioners' argument that "EPA overstepped TSCA's bounds by seeking to ban products that once were, but no longer are, being produced in the United States." *Id.* at 1228.

Based upon the above language in the opinion, EPA tentatively concluded that the Court intended to leave in effect that part of the rule that governed products that were not being produced or imported. To ensure that it was properly interpreting the decision, however, EPA filed a Motion for Clarification ("the Motion") with the Court. In the Motion, EPA noted that, while one section of the opinion seemed to leave intact the portion of the rule that governed asbestos-containing products that were no longer being produced or imported, another section of the opinion could arguably be interpreted as vacating and remanding the entire rule. EPA asked the Court to resolve the possible inconsistency. *Id.* at 591–592. EPA specifically requested clarification with respect to the status of the various asbestos-containing products that were banned in the first phase of the rule, and thus were no longer being manufactured, produced, or imported.

The Petitioners, including the Asbestos Information Association (AIA), opposed the Motion. They argued that EPA had improperly suggested that portions of the rule were not vacated, and asserted that the Court had vacated and remanded the rule in its entirety. They also noted that there was some uncertainty regarding whether some products banned by EPA were being manufactured or imported as of July 12, 1989, and suggested that the Agency, rather than the Court, should resolve this issue. Petitioners' Response to EPA's Motion for Time Extension, *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201 (5th Cir. 1991)(No. 89–4596).

The Court granted EPA's Motion. It did not adopt Petitioners' argument that the entire rule was vacated. Instead, the Court clarified the identity of the class of asbestos-containing products that continue to be subject to the rule. It specified that the "holding in part V.D. of our opinion applies only to products that were not being manufactured, imported, or processed on July 12, 1989." *Id.* at 1230. It also left it to EPA to resolve any factual disputes regarding whether a particular product fell within that category. *Id.*

In light of this clarification, it is clear that the Court did not require EPA to go through an entirely new rulemaking process, but instead authorized a factual inquiry into the actual status of particular asbestos-containing products as necessary.

EPA also filed a Request for Rehearing, which the Court denied on November 27, 1991. The Government decided not to file a petition for a Writ of Certiorari to the United States Supreme Court.

Because the Court's date of July 12, 1989, corresponded to the date of publication, rather than to any time benchmark in the rule, EPA decided that additional information regarding the July 12, 1989, status of various asbestos-containing products would assist the Agency in identifying the products that continue to be subject to the rule. Although published in 1989, the Regulatory Impact Analysis (RIA) only contained information that was current as of 1986. (The purpose of a RIA is to show that the rule complies with the requirements of Executive Order 12291. The RIA includes information on the need for the rule, the available options, the costs and benefits of each option, and the justification for the option selected. In addition, the RIA supports the finding of "unreasonable risk" required under TSCA section 6(a), and the determination of the least burdensome requirements to protect adequately against the risk.) However, two surveys conducted by EPA in 1991 confirmed information in the RIA. Moreover, in pleadings in *Corrosion Proof Fittings*, AIA and the Asbestos Institute (AI) acknowledged to the Court that some products were not in production when the final rule was issued in 1989. Joint Brief of Petitioners, the Asbestos Information Association/ North America and the Asbestos Institute, at 94–95 and n. 241, *Corrosion Proof Fittings* (No. 89–4596). Other information submitted to EPA, however, raised questions about the status of some products.

As a result, EPA issued a notice in the **Federal Register** of April 2, 1992, (57 FR 11364) that requested information on the status of 14 product categories in the rule that, based on information contained in the RIA for the rule, may no longer have been manufactured, processed, or imported when the rule was published on July 12, 1989. The information was solicited in order to determine which of these categories were in fact no longer being manufactured, processed, or imported on July 12, 1989, and are, therefore, still subject to the rule. In addition, EPA solicited information on the status of any other product category in the rule that also may no longer have been manufactured, processed, or imported on July 12, 1989.

EPA supplemented the original information in the RIA with the comments received in response to the **Federal Register** notice and with additional research. In evaluating the information, EPA did not conclude that a product category was no longer being manufactured, processed, or imported simply because no information was available, or just because no comment was received in response to the **Federal Register** notice. Rather, EPA only

HeinOnline -- 58 Fed. Reg. 58965 1993

concluded that a product was no longer being manufactured, processed, or imported if there were a factual basis to support such a conclusion. Doubts were resolved in favor of concluding that a product was still being manufactured, processed, or imported.

This document gives EPA's final factual determinations and summarizes the information upon which each determination was made. The documents supporting EPA's conclusions have been deposited in the docket for this fact-finding.

II. Status of Products

In accordance with the Court decision, and based on information from the RIA for the rule, responses to EPA's April 2, 1992, notice in the **Federal Register**, and additional EPA research, EPA concludes that:

1. The six asbestos-containing product categories that are still subject to the rule are corrugated paper, rollboard, commercial paper, specialty paper, flooring felt, and new uses of asbestos.

2. The asbestos-containing product categories that are no longer subject to the rule are: asbestos-cement corrugated sheet, asbestos-cement flat sheet, asbestos clothing, pipeline wrap, roofing felt, vinyl-asbestos floor tile, asbestos-cement shingle, millboard, asbestos-cement pipe, automatic transmission components, clutch facings, friction materials, disc brake pads, drum brake linings, brake blocks, gaskets, non-roofing coatings, and roof coatings.

A. Products Still Subject to the Asbestos Ban

EPA has concluded that the Court in *Corrosion Proof Fittings* left intact the provisions of the rule that governed asbestos-containing products that were not being manufactured, produced, or imported on July 12, 1989. In its clarification, the Court recognized that EPA could undertake a factual inquiry into the July 12, 1989, status of particular products to determine whether such products continued to be regulated by the rule.

In response to EPA's April 2, 1992, **Federal Register** notice, AIA, one of the Petitioners in *Corrosion Proof Fittings*, submitted comments stating that the decision voided the entire rule and that "bans on discontinued products must take the form of a new rule." As indicated previously, EPA does not believe that AIA's interpretation is supported by the language of the decision. See discussion in Unit I of this document. Therefore, EPA concludes that the following product catagories remain subject to the ban rule:

1. *New uses of asbestos.* By definition, new uses of asbestos are those that were not manufactured, processed, or imported on July 12, 1989. The rule defines "new uses of asbestos" as "commercial uses of asbestos not identified in § 763.165 the manufacture, importation, or processing of which would be initiated for the first time after August 25, 1989" (40 CFR 763.163). Based upon this definition, any product that was being manufactured, imported, or processed on July 12, 1989, automatically cannot be a "new use of asbestos" because the manufacture, importation, or processing of such a product would have been initiated on or before August 25, 1989. Thus, any product that is a "new use of asbestos" could not have been manufactured, imported, or processed on July 12, 1989, and continues to be governed by the rule pursuant to the Court's clarified decision.

2. *Corrugated paper.* The 1989 RIA for the rule concluded that there were no longer any manufacturers, processors, or importers of corrugated paper in 1986. Responses to EPA's April 2, 1992, **Federal Register** notice did not include any comment indicating that asbestos-containing corrugated paper was being manufactured, processed, or imported on July 12, 1989. Thus, EPA's conclusion in the RIA is not refuted. Therefore, EPA concludes that asbestos-containing corrugated paper was not being manufactured, processed, or imported on July 12, 1989, and is still subject to the rule.

3. *Rollboard.* The 1989 RIA for the rule concluded that there were no longer any manufacturers, processors, or importers of rollboard in 1986. Responses to EPA's April 2, 1992, **Federal Register** notice did not include any comment indicating that asbestos-containing rollboard was being manufactured, processed, or imported on July 12, 1989. Thus, EPA's conclusion in the RIA is not refuted. Therefore, EPA concludes that asbestos-containing rollboard was not being manufactured, processed, or imported on July 12, 1989, and is still subject to the rule.

4. *Commercial paper.* The 1989 RIA for the rule concluded that there were no longer any manufacturers, processors, or importers of commercial paper in 1986, although one company was selling small amounts out of inventory. Responses to EPA's April 2, 1992, **Federal Register** notice did not include any comment indicating that asbestos-containing commercial paper was being manufactured, processed, or imported on July 12, 1989. The company that was selling small amounts out of inventory, Quin-T, did not comment on commercial paper, although it did comment on pipeline wrap. Thus, EPA's conclusion in the RIA is not refuted. Therefore, EPA concludes that commercial paper was not being manufactured, processed, or imported on July 12, 1989, and is still subject to the rule.

5. *Specialty paper.* The 1989 RIA for the rule assumed that two companies that were producing asbestos-containing specialty paper in 1981 were still producing specialty paper in 1986 because the companies did not respond to a 1985 survey. The RIA allocated 50 percent of the market for specialty paper to each company, indicating that there was no importation. In response to a phone inquiry from EPA in 1992, both companies reported that they stopped using asbestos before 1986.

In its response to the April 2, 1992, **Federal Register** notice, AIA expressly declined to address specialty paper, but stated that EPA's 1989 notice in the **Federal Register** "found [specialty paper] still in commerce," because "specialty paper was noted to still be in production, and cancers avoided by a ban were calculated." The 1989 **Federal Register** notice did include an estimate of the number of cancer cases avoided that would result from the ban on specialty paper. At the time, EPA assumed, for purposes of analysis, that the two companies that had been producing asbestos-containing specialty paper in 1981, were still producing asbestos-containing specialty paper. However, as indicated above, the companies reported that they actually had stopped using asbestos before 1986.

Responses to EPA's April 2, 1992, **Federal Register** notice did not provide any evidence that specialty paper was being manufactured, processed, or imported on July 12, 1989. Therefore, EPA concludes that asbestos-containing specialty paper was not being manufactured, processed, or imported on July 12, 1989, and is still subject to the rule.

6. *Flooring felt.* The 1989 RIA for the rule concluded that there were no producers, processors, or importers of flooring felt in 1986.

In response to EPA's April 2, 1992, **Federal Register** notice, the Resilient Floor Covering Institute (RFCI) submitted a letter to EPA stating that its members had not manufactured or imported asbestos-containing products since the mid-80s. RFCI also submitted Department of Commerce import reports for 1989 and 1990 which showed importation of "asbestos vinyl tile" and "sheet vinyl flooring." RFCI asserted that "because vinyl tile containing

HeinOnline -- 58 Fed. Reg. 58966 1993

asbestos was imported during this time period, it is reasonable to assume that a portion of the sheet vinyl imports contained an asbestos felt backing." RFCI, however, did not submit any information that would support its assertion that that assumption would be reasonable, and EPA is not aware of any such information.

AIA expressly declined to submit information concerning the status of flooring felt. AIA simply alleged that EPA "found [flooring felt] still in commerce" in the preamble to the rule, because the preamble purportedly said that "flooring felt was 'largely' no longer produced in the U.S." The preamble statement referenced by AIA actually referred to several different types of felt product categories, including roofing felt, pipeline wrap and flooring felt, and provided that "these products are largely no longer produced in the U.S." 54 FR 29490. Because the statement was general in nature, referring to the status of several product categories, it cannot logically be relied upon to demonstrate that one particular category of felt product, flooring felt, was actually in production. Moreover, the preamble discussion of felt products specifically provides that there was "no current U.S. manufacture or import" of flooring felt.

EPA was not able to locate any company that manufactured, processed, or produced asbestos-containing flooring felt, and no direct evidence was submitted to show that asbestos-containing flooring felt was, in fact, being manufactured, processed, or imported in July 1989. Therefore, EPA concludes that asbestos-containing flooring felt was no longer being manufactured, processed, or imported on July 12, 1989, and is still subject to the rule.

B. Products No Longer Subject to the Asbestos Ban

Except as provided in Unit II.A of this document, EPA concludes that all other products originally subject to the ban rule were being manufactured, processed, or imported on July 12, 1989, and are therefore no longer subject to the ban rule. Of the 14 products mentioned in the April 2, 1992, **Federal Register** notice, the following eight are no longer subject to the ban rule:

1. *Pipeline wrap.* In the 1989 RIA for the rule, EPA concluded that in 1986, one former producer was selling pipeline wrap out of inventory and might restart production if demand warranted it, and that only one company was importing the product.

In response to EPA's April 2, 1992, **Federal Register** notice, the AIA submitted production summaries from the Quin-T Company indicating that it had produced asbestos-containing pipeline wrap until the end of 1989. AIA also submitted U.S. Customs Declarations that showed importation of asbestos-containing pipeline wrap after July 1989. Based upon this information, EPA concludes that asbestos-containing pipeline wrap was being manufactured, processed, or imported on July 12, 1989, and is no longer subject to the rule.

2. *Vinyl/asbestos tile.* The 1989 RIA for the rule concluded that there were no manufacturers, processors, or importers of vinyl/asbestos tile in 1986.

In response to EPA's April 2, 1992, **Federal Register** notice, RFCI stated that its members had not manufactured an asbestos-containing product since the mid-80s. But RFCI also submitted Department of Commerce import reports for 1989 and 1990 that showed importation of "vinyl/asbestos tile." Therefore, EPA concludes that vinyl/asbestos tile was being manufactured, processed, or imported on July 12, 1989, and is no longer subject to the rule.

3. *Millboard.* The 1989 RIA for the rule concluded that in 1986 there was one primary processor, one former processor that continued to sell out of inventory, and four secondary processors, but no importers of asbestos-containing millboard.

In response to EPA's April 2, 1992, **Federal Register** notice, AIA submitted production notes from the Quin-T Company that showed production of asbestos-containing millboard in 1989, 1990, and 1992, and Department of Commerce import reports for 1989 and 1990 that showed importation of "asbestos paper, millboard, and felt." Thus, EPA concludes that asbestos-containing millboard was still being manufactured, processed, or imported on July 12, 1989, and is no longer subject to the rule.

4. *Asbestos clothing.* The 1989 RIA for the rule concluded that in 1986 "small quantities of asbestos-containing gloves and mittens have been and continue to be imported from foreign countries . . . but no specific data could be identified."

In response to EPA's April 2, 1992, **Federal Register** notice, AIA submitted Department of Commerce import reports for 1989 and 1990 that showed importation of "asbestos clothing, accessories, and headgear excl. footwear." Therefore, EPA concludes that asbestos-containing clothing was still being manufactured, processed, or imported on July 12, 1989, and is no longer subject to the rule.

5. *Asbestos-cement corrugated sheet.* The 1989 RIA for the rule concluded that asbestos-cement corrugated sheet was no longer produced in the U.S. and that there was only one importer in 1986.

In response to EPA's April 2, 1992, **Federal Register** notice, AIA submitted a number of documents to show that asbestos-cement corrugated sheet was still being processed or imported. Among the documents submitted by AIA were: (1) A January 1989, purchase order to Turner Building Products in Mission, British Columbia, Canada, from Western Specialty Products in San Jose, California, for Potlatch Corporation in Lewiston, Idaho, for "cavity deck roofing," (2) a March 1989, Canadian Customs export declaration from Turner to Western for "cavity deck," (3) a December 1990, Material Safety Data Sheet (MSDS) from Turner for "T Deck and Cavity Deck," and (4) undated product literature from Turner for "Asbestos Cement Roof Decks." AIA also submitted Department of Commerce import reports for "Corrugated Sheets of Asbestos Cement or Cellulose Fiber Cement or the like" that show imports in 1989.

One importer, AWMCO, stated that it had imported and fabricated asbestos-cement sheet until August 1990, and continued to sell asbestos-cement sheet out of inventory until 1992, when it resumed importing and fabrication after consultation with AIA. Therefore, EPA concludes that asbestos-cement corrugated sheet was being manufactured, processed, or imported on July 12, 1989, and is no longer subject to the rule.

6. *Asbestos-cement flat sheet.* The 1989 RIA for the rule concluded that there was one producer of asbestos-cement flat sheet and one importer in 1986.

In response to EPA's April 2, 1992, **Federal Register** notice, AIA submitted a number of documents to show that asbestos-cement flat sheet was still being processed or imported. Among the documents were: (1) Two 1989 Canadian Customs declarations from Turner to AWMCO, an MSDS from Turner, and product literature from Turner for asbestos-cement sheet products, (2) a 1989 Mexican Export Declaration and shipping papers from Versalite del Noroeste in Mexico to Supralite in the U.S. for asbestos-cement sheet, and (3) Department of Commerce import reports that show imports of "Sheets, Panels, Tiles and Similar Articles [Not Elsewhere Specified or Included] of Asbestos Cement, Cellulose Fiber Cement, or the like" in 1989 and 1990.

In its comments, AWMCO stated that it had imported and fabricated asbestos-cement sheet until August 1990, and

HeinOnline -- 58 Fed. Reg. 58967 1993

continued to sell out of inventory until 1992, when it resumed import and fabrication after consultation with AIA. Therefore, EPA concludes that asbestos-cement flat sheet was being manufactured, processed, or imported on July 12, 1989, and is no longer subject to the rule.

7. *Roofing felt.* The 1989 RIA for the rule concluded that, while there were no primary processors, there was one secondary processor, and one importer of asbestos-containing roofing felt in 1986.

The importer, Power Marketing Group, reported that it imported a large stock of asbestos-containing roofing felt before the ban went into effect, and continued to sell out of inventory until the stock was exhausted in 1991.

In response to EPA's April 2, 1992, **Federal Register** notice, AIA submitted product literature from Kingsey-Falls, Inc., for asbestos-containing roofing felt, and Canadian Customs declarations and shipping papers to show that asbestos-containing roofing felt was being imported in January and August 1989. AIA also submitted product literature from Supradur Manufacturing Corporation, an American manufacturer, that includes asbestos-containing roofing felt. EPA concludes that asbestos-containing roofing felt was still being processed, or imported in July 1989, and is no longer subject to the rule.

8. *Asbestos-cement shingle.* The 1989 RIA for the rule concluded that there was only one remaining domestic producer and one known importer of asbestos-cement shingle in 1986.

In response to EPA's April 2, 1992, **Federal Register** notice, AIA submitted product literature from the Supradur Manufacturing Corporation for asbestos-cement roofing shingles, and a letter from Supradur to AIA that stated Supradur was manufacturing asbestos-cement shingle in Pennsylvania "as of July 1, 1989" and "continued until 1992," and that asbestos-cement shingle products are "still being sold and applied in the U.S. market." As a result, EPA concludes that asbestos-cement shingles were still being manufactured, processed, or imported on July 12, 1989, and are no longer subject to the rule.

III. Public Record

EPA established a record (docket number OPPTS–62114) for comments submitted pursuant to the April 2, 1992, **Federal Register** notice, and for the information listed below regarding the July 12, 1989, status of asbestos-containing products received by EPA after the Court's decision. A public version of the record, from which all confidential business information has been deleted, is available for inspection in the TSCA Nonconfidential Information Center (NCIC), Rm. E–G102, 401 M St., SW, Washington, DC, from 8 a.m. to noon and from 1 p.m. to 4 p.m., Monday through Friday, except legal holidays. These documents include:

1. Decision of the U.S. Court of Appeals for the Fifth Circuit in *Corrosion Proof Fittings vs. EPA*, No. 89–4596 (5th Cir., October 18, 1991).

2. U.S. Fifth Circuit Court of Appeals Clarification of its Decision in *Corrosion Proof Fittings vs. EPA*, No. 89–456 (5th Cir., November 15, 1991).

3. *Regulatory Impact Analysis of Controls on Asbestos and Asbestos Products*, Final Report, Volume III, Appendix F, January 19, 1989.

4. *RM2 Scoping Asbestos: Current Commercial Status of Seven Asbestos Product Categories*, Mathtech, December 20, 1991.

5. *RM2 Scoping Asbestos: Industry/Use Profile*, Mathtech, November 26, 1991.

6. *ABPO Rule Remand Activities*, November 6, 1992, briefing for the Assistant Administrator of the Office of Pollution Prevention and Toxics.

7. Record of phone call to the Bureau of Mines concerning asbestos producer survey, October 1992.

8. Record of phone call to Alsop Engineering and to Beaver Industries concerning asbestos use, September 1992.

9. Memo from ICF Incorporated to Kent Benjamin, EPA, concerning Asbestos Rulemaking Support, August 28, 1992.

10. Record of phone call to Tuyaux Atlas concerning asbestos use, August 1992.

List of Subjects in 40 CFR Part 763

Environmental protection, Asbestos.

Dated: October 22, 1993.

Victor J. Kimm,

Acting Assistant Administrator for Prevention, Pesticides and Toxic Substances.

[FR Doc. 93–26994 Filed 11–4–93; 8:45 am]

BILLING CODE 6560–50–F

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

43 CFR Public Land Order 7007

[NM 010–4210–06; NMNM 86825]

Withdrawal of Public Lands and Federal Minerals for the Ball Ranch Area of Critical Environmental Concern; New Mexico

AGENCY: Bureau of Land Management, Interior.

ACTION: Public land order.

SUMMARY: This order withdraws 1,458.68 acres of public lands from surface entry and mining for a period of 20 years for the Bureau of Land Management to protect the rare and endemic plant populations and paleontological resources of the Ball Ranch Area of Critical Environmental Concern. The lands have been and will remain open to mineral leasing.

EFFECTIVE DATE: November 5, 1993.

FOR FURTHER INFORMATION CONTACT: Debby Lucero, BLM Rio Puerco Resource Area, 435 Montano NE., Albuquerque, New Mexico 87107, 505–761–8700.

By virtue of the authority vested in the Secretary of the Interior by section 204 of the Federal Land Policy and Management Act of 1976, 43 U.S.C. 1714 (1988), it is ordered as follows:

1. Subject to valid existing rights, the following described public lands are hereby withdrawn from settlement, sale, location, or entry under the general land laws, including the United States mining laws (30 U.S.C. ch. 2 (1988)), but not from leasing under the mineral leasing laws, to protect a Bureau of Land Management Area of Critical Environmental Concern:

New Mexico Principal Meridian

T. 13 N., R. 6 E.,
  Sec. 4, lots 3 and 4, S½NW¼ and SW¼;
  Sec. 5, lots 1 and 2, S½NE¼ and SE ¼.
T. 14 N., R. 6 E.,
  Sec. 19, E½;
  Sec. 20, W½;
  Sec. 31, NE¼ and N½NE¼SE¼.

The areas described aggregate 1,458.68 acres in Sandoval County.

2. The withdrawal made by this order does not alter the applicability of those public land laws governing the use of the lands under lease, license, or permit, or governing the disposal of their mineral or vegetative resources other than under the mining laws.

3. This withdrawal will expire 20 years from the effective date of this order unless, as a result of a review conducted before the expiration date pursuant to section 204(f) of the Federal Land Policy and Management Act of 1976, 43 U.S.C. 1714(f) (1988), the Secretary determines that the withdrawal shall be extended.

HeinOnline -- 58 Fed. Reg. 58968 1993

[Federal Register Volume 59, Number 123 (Tuesday, June 28, 1994)]
[Unknown Section]
[Page]
From the Federal Register Online via the Government Printing Office [www.gpo.gov]
[FR Doc No: 94-15676]

[Federal Register: June 28, 1994]

ENVIRONMENTAL PROTECTION AGENCY
40 CFR Part 763

[OPPTS-62114B; FRL-4776-7]

Technical Amendment in Response to Court Decision on Asbestos; Manufacture, Importation, Processing and Distribution Prohibitions

AGENCY: Environmental Protection Agency (EPA).

ACTION: Technical amendment.

SUMMARY: EPA is revising the language of the Prohibition of the Manufacture, Importation, Processing, and Distribution in Commerce of Certain Asbestos-containing Products; Labeling Requirements Rule (also known as the Asbestos Ban and Phase Out or ABPO Rule) in the Code of Federal Regulations (CFR) to conform to a court decision that vacated and remanded part of the ABPO Rule and to an EPA factfinding conducted in accordance with the court's decision. The ABPO Rule prohibited the manufacture, importation, processing, and distribution in commerce of most asbestos-containing products in three stages over 7 years beginning in 1990. On October 18, 1991, the United States Court of Appeals for the Fifth Circuit (the court) vacated and remanded most of the ABPO Rule. In a subsequent clarification, the court said the rule continued to govern asbestos-containing products that were not being manufactured, imported, or processed on July 12, 1989. EPA conducted a factfinding and concluded that six asbestos-containing product categories in the ABPO Rule were not being manufactured, processed, or imported on July 12, 1989, and thus are still subject to the rule. This document revises the CFR to conform to the findings of EPA in accordance with the court decision, and requires no notice and public comment.

EFFECTIVE DATE: This document is effective on June 28, 1994.

FOR FURTHER INFORMATION CONTACT: Susan B. Hazen, Director, Environmental Assistance Division (7408), Office of Pollution Prevention and Toxics, Environmental Protection Agency, 401 M St., SW., Washington, DC 20460, Telephone: (202) 554-1404, TDD: (202) 554-0551.

SUPPLEMENTARY INFORMATION: In the Federal Register of July 12, 1989 (54 FR 29460), EPA issued a final rule under section 6 of the Toxic Substances Control Act (TSCA)(15 U.S.C. 2605) that prohibited the manufacture, importation, processing, and distribution in commerce of

most asbestos-containing products in three stages over 7 years (40 CFR 763.160 through 763.179). Stage 1 of the ban went into effect in August 1990. Stages 2 and 3 were scheduled to go into effect in 1993 and 1996 respectively.

On October 18, 1991, the United States Court of Appeals for the Fifth Circuit vacated and remanded most of the ABPO Rule. Corrosion Proof Fittings v. EPA, 947 F.2d 1201 (5th Cir., 1991). In a latter clarification, the court stated that product categories in the ABPO Rule that were no longer being manufactured, imported, or processed on July 12, 1989, when the ABPO Rule was issued were still subject to the rule. Id. at 1230. The court left it to EPA to resolve any factual disputes about which product categories in the ABPO Rule were no longer in commerce on July 12, 1989.

As a result, in order to determine which product categories in the ABPO Rule were still subject to the rule, EPA published a document in the Federal Register of April 2, 1992 (57 FR 11364), that requested information on the commercial status on July 12, 1989, of 14 product categories in the rule that may no longer have been manufactured, processed, or imported when the rule was published on July 12, 1989. In addition, EPA solicited information on the commercial status of any other product category in the ABPO Rule that also may no longer have been manufactured, processed, or imported on July 12, 1989. EPA supplemented the original information in the RIA with the comments received in response to the Federal Register notice and with additional research.

EPA published a document in the Federal Register of November 5, 1993 (58 FR 58964), that announced its findings concerning the regulatory status of the product categories in the ABPO Rule. EPA concluded that six asbestos-containing product categories were not being manufactured, processed, or imported on July 12, 1989, and thus are still subject to the rule. The remaining product categories were being manufactured, processed, or imported on July 12, 1989, and are no longer subject to the rule.

Accordingly, EPA is issuing this document to revise the language of the ABPO Rule in the CFR to conform to the October 1991 court decision that remanded the rule and to the November 1992 factual findings of EPA, in accordance with the court decision.

List of Subjects in 40 CFR Part 763

Environmental protection, Asbestos, Hazardous substances.

Dated: June 21, 1994.

Victor J. Kimm,

Acting Assistant Administrator for Prevention, Pesticides and Toxic Substances.

Therefore, 40 CFR part 763 is amended as follows:

PART 763--[AMENDED]

1. The authority citation for part 763 continues to read as follows:

Authority: 15 U.S.C. 2605 and 2607(c).

2. By revising Sec. 763.163 to read as follows.

Sec. 763.163 Definitions.

For purposes of this subpart:

Act means the Toxic Substances Control Act, 15 U.S.C. 2601 et seq.

Agency means the United States Environmental Protection Agency.

Asbestos means the asbestiform varieties of: chrysotile (serpentine); crocidolite (riebeckite); amosite (cummingtonite-grunerite); tremolite; anthophyllite; and actinolite.

Asbestos-containing product means any product to which asbestos is deliberately added in any concentration or which contains more than 1.0 percent asbestos by weight or area.

Chemical substance, has the same meaning as in section 3 of the Act.

Commerce has the same meaning as in section 3 of the Act.

Commercial paper means an asbestos-containing product which is made of paper intended for use as general insulation paper or muffler paper. Major applications of commercial papers are insulation against fire, heat transfer, and corrosion in circumstances that require a thin, but durable, barrier.

Corrugated paper means an asbestos-containing product made of corrugated paper, which is often cemented to a flat backing, may be laminated with foils or other materials, and has a corrugated surface. Major applications of asbestos corrugated paper include: thermal insulation for pipe coverings; block insulation; panel insulation in elevators; insulation in appliances; and insulation in low-pressure steam, hot water, and process lines.

Customs territory of the United States means the 50 States, Puerto Rico, and the District of Columbia.

Distribute in commerce has the same meaning as in section 3 of the Act, but the term does not include actions taken with respect to an asbestos-containing product (to sell, resale, deliver, or hold) in connection with the end use of the product by persons who are users (persons who use the product for its intended purpose after it is manufactured or processed). The term also does not include distribution by manufacturers, importers, and processors, and other persons solely for purposes of disposal of an asbestos-containing product.

Flooring felt means an asbestos-containing product which is made of paper felt intended for use as an underlayer for floor coverings, or to be bonded to the underside of vinyl sheet flooring.

Import means to bring into the customs territory of the United States, except for: (1) Shipment through the customs territory of the United States for export without any use, processing, or disposal within the customs territory of the United States; or (2) entering the customs territory of the United States as a component of a product during normal personal or business activities involving use of the product.

Importer means anyone who imports a chemical substance, including a chemical substance as part of a mixture or article, into the customs territory of the United States. Importer includes the person primarily liable for the payment of any duties on the merchandise or an authorized agent acting on his or her behalf. The term includes as appropriate:

(1) The consignee.

(2) The importer of record.

(3) The actual owner if an actual owner's declaration and superseding bond has been filed in accordance with 19 CFR 141.20.

(4) The transferee, if the right to withdraw merchandise in a bonded warehouse has been transferred in accordance with subpart C of 19 CFR Part 144.

Manufacture means to produce or manufacture in the United States.

Manufacturer means a person who produces or manufactures in the United States.

New uses of asbestos means commercial uses of asbestos not identified in Sec. 763.165 the manufacture, importation or processing

of which would be initiated for the first time after August 25, 1989.

Person means any natural person, firm, company, corporation, joint-venture, partnership, sole proprietorship, association, or any other business entity; any State or political subdivision thereof, or any municipality; any interstate body and any department, agency, or instrumentality of the Federal Government.

Process has the same meaning as in section 3 of the Act.

Processor has the same meaning as in section 3 of the Act.

Rollboard means an asbestos-containing product made of paper that is produced in a continuous sheet, is flexible, and is rolled to achieve a desired thickness. Asbestos rollboard consists of two sheets of asbestos paper laminated together. Major applications of this product include: office partitioning; garage paneling; linings for stoves and electric switch boxes; and fire-proofing agent for security boxes, safes, and files.

Specialty paper means an asbestos-containing product that is made of paper intended for use as filters for beverages or other fluids or as paper fill for cooling towers. Cooling tower fill consists of asbestos paper that is used as a cooling agent for liquids from industrial processes and air conditioning systems.

State has the same meaning as in section 3 of the Act.

Stock-on-hand means the products which are in the possession, direction, or control of a person and are intended for distribution in commerce.

United States has the same meaning as in section 3 of the Act.

3. By revising Sec. 763.165 to read as follows:

Sec. 763.165 Manufacture and importation prohibitions.

(a) After August 27, 1990, no person shall manufacture or import the following asbestos-containing products, either for use in the United States or for export: flooring felt and new uses of asbestos.

(b) After August 26, 1996, no person shall manufacture or import the following asbestos-containing products, either for use in the United States or for export: commercial paper, corrugated paper, rollboard, and specialty paper.

(c) The import prohibitions of this subpart do not prohibit:

(1) The import into the customs territory of the United States of products imported solely for shipment outside the customs territory of the United States, unless further repackaging or processing of the product is performed in the United States; or

(2) Activities involving purchases or acquisitions of small quantities of products made outside the customs territory of the United States for personal use in the United States.

4. By revising Sec. 763.167 to read as follows:

Sec. 763.167 Processing prohibitions.

(a) After August 27, 1990, no person shall process for any use, either in the United States or for export, any of the asbestos-containing products listed at Sec. 763.165(a).

(b) After August 26, 1996, no person shall process for any use, either in the United States or for export, any of the asbestos-containing products listed at Sec. 763.165(b).

5. By revising Sec. 763.169 to read as follows:

Sec. 763.169 Distribution in commerce prohibitions.

(a) After August 25, 1992, no person shall distribute in commerce, either for use in the United States or for export, any of the asbestos-containing products listed at Sec. 763.165(a).

(b) After August 25, 1997, no person shall distribute in commerce, either for use in the United States or for export, any of the asbestos-containing products listed at Sec. 763.165(b).

(c) A manufacturer, importer, processor, or any other person who is subject to a ban on distribution in commerce in paragraph (a) or (b) of this section must, within 6 months of the effective date of the ban of a specific asbestos-containing product from distribution in commerce, dispose of all their remaining stock-on-hand of that product, by means that are in compliance with applicable local, State, and Federal restrictions which are current at that time.

6. By revising Sec. 763.171 to read as follows:

Sec. 763.171 Labeling requirements.

(a) After August 27, 1990, manufacturers, importers, and processors of all asbestos-containing products that are identified in Sec. 763.165(a) shall label the products as specified in this subpart at the time of manufacture, import, or processing. This requirement includes labeling all manufacturers', importers', and processors' stock-on-hand as of August 27, 1990.

(b) After August 25, 1995, manufacturers, importers, and processors of all asbestos-containing products that are identified in Sec. 763.165(b), shall label the products as specified in this subpart at the time of manufacture, import, or processing. This requirement includes labeling all manufacturers', importers', and processors' stock-on-hand as of August 25, 1995.

(c) The label shall be placed directly on the visible exterior of the wrappings and packaging in which the product is placed for sale, shipment, or storage. If the product has more than one layer of external wrapping or packaging, the label must be attached to the innermost layer adjacent to the product. If the innermost layer of product wrapping or packaging does not have a visible exterior surface larger than 5 square inches, either a tag meeting the requirements of paragraph (d) of this section must be securely attached to the product's innermost layer of product wrapping or packaging, or a label must be attached to the next outer layer of product packaging or wrapping. Any products that are distributed in commerce to someone other than the end user, shipped, or stored without packaging or wrapping must be labeled or tagged directly on a visible exterior surface of the product as described in paragraph (d) of this section.

(d)(1) Labels must be either printed directly on product packaging or in the form of a sticker or tag made of plastic, paper, metal, or other durable substances. Labels must be attached in such a manner that they cannot be removed without defacing or destroying them. Product labels shall appear as in paragraph (d)(2) of this section and consist of block letters and numerals of color that contrasts with the background of the label or tag. Labels shall be sufficiently durable to equal or exceed the life, including storage and disposal, of the product packaging or wrapping. The size of the label or tag must be at least 15.25 cm (6 inches) on each side. If the product packaging is too small to accommodate a label of this size, the label may be reduced in size proportionately to the size of the product packaging or wrapping down to a minimum 2.5 cm (1 inch) on each side if the product wrapping or packaging has a visible exterior surface larger than 5 square inches.

(2) Products subject to this subpart shall be labeled in English as follows:

NOTICE

This product contains ASBESTOS. The U.S. Environmental Protection Agency has banned the distribution in U.S. commerce of this product under section 6 of the Toxic Substances Control Act (15 U.S.C. 2605) as of (insert effective date of ban on distribution in commerce). Distribution of this product in commerce after this date and intentionally removing or tampering with this label are violations of Federal law.

(e) No one may intentionally remove, deface, cover, or otherwise obscure or tamper with a label or sticker that has been applied in compliance with this section, except when the product is used or disposed of.

7. In Sec. 763.173 by revising the section heading and paragraphs (a), (b), (c), and (g) to read as follows:

Sec. 763.173 Exemptions.

(a) Persons who are subject to the prohibitions imposed by Secs. 763.165, 763.167, or 763.169 may file an application for an exemption. Persons whose exemption applications are approved by the Agency may manufacture, import, process, or distribute in commerce the banned product as specified in the Agency's approval of the application. No applicant for an exemption may continue the banned activity that is the subject of an exemption application after the effective date of the ban unless the Agency has granted the exemption or the applicant receives an extension under paragraph (b)(4) or (5) of this section.

(b) Application filing dates. (1) Applications for products affected by the prohibitions under Secs. 763.165(a) and 763.167(a) may be submitted at any time and will be either granted or denied by EPA as soon as is feasible.

(2) Applications for products affected by the ban under Sec. 763.169(a) may be submitted at any time and will be either granted or denied by EPA as soon as is feasible.

(3) Applications for products affected by the ban under Secs. 763.165(b) and 763.167(b) may not be submitted prior to February 27, 1995. Complete applications received after that date, but before August 25, 1995, will be either granted or denied by the Agency prior to the effective date of the ban for the product. Applications received after August 25, 1995, will be either granted or denied by EPA as soon as is feasible.

(4) Applications for products affected by the ban under Sec. 763.169(b) may not be submitted prior to February 26, 1996. Complete applications received after that date, but before August 26, 1996, will be either granted or denied by the Agency prior to the effective date of the ban for the product. Applications received after August 26, 1996, will be either granted or denied by EPA as soon as is feasible.

(5) The Agency will consider an application for an exemption from a ban under Sec. 763.169 for a product at the same time the applicant submits an application for an exemption from a ban under Sec. 763.165 or Sec. 763.167 for that product. EPA will grant an exemption at that time from a ban under Sec. 763.169 if the Agency determines it appropriate to do so.

(6) If the Agency denies an application less than 30 days before the effective date of a ban for a product, the applicant can continue the activity for 30 days after receipt of the denial from the Agency.

(7) If the Agency fails to meet the deadlines stated in paragraphs (b)(3) and (b)(4) of this section for granting or denying a complete application in instances in which the deadline is before the effective date of the ban to which the application applies, the applicant will be granted an extension of 1 year from the Agency's deadline date. During this extension period the applicant may continue the activity that is the subject of the exemption application. The Agency will either grant or deny the application during the extension period. The extension period will terminate either on the date the Agency grants the application or 30 days after the applicant receives the Agency's denial of the application. However, no extension will be granted if the Agency is scheduled to grant or deny an application at some date after the effective date of the ban, pursuant to the deadlines stated in paragraphs (b)(3) and (b)(4) of this section.

(c) Where to file. All applications must be submitted to the following location: TSCA Docket Receipts Office (7407), Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency, Rm E-G99, 401 M St., SW., Washington, DC 20460, ATTENTION: Asbestos Exemption. For information regarding the submission of exemptions containing information claimed as confidential business information (CBI), see Sec. 763.179.

* * * * *

(g) If the application does not include all of the information required in paragraph (d) of this section, the Agency will return it to the applicant as incomplete and any resubmission of the application will be considered a new application for purposes of the availability of any extension period. If the application is substantially inadequate to allow the Agency to make a reasoned judgment on any of the information required in paragraph (d) of this section and the Agency chooses to request additional information from the applicant, the Agency may also determine that an extension period provided for in paragraph (b)(5) of this section is unavailable to the applicant.

* * * * *

[FR Doc. 94-15676 Filed 6-27-94; 8:45 am]
BILLING CODE 6560-50-F

Asbestos NESHAP Clarification of Intent

[Federal Register: July 28, 1995 (Volume 60, Number 145)]
[Rules and Regulations]
[Page 38725-38726]

ENVIRONMENTAL PROTECTION AGENCY
40 CFR Part 61
[FRL-5266-2]

Asbestos NESHAP Clarification of Intent
AGENCY: Environmental Protection Agency.
ACTION: Notice of clarification.

SUMMARY: On November 20, 1990, the Federal Register published the Environmental Protection Agency's (the Agency's) revision of the National Emission Standard for Hazardous Air Pollutants for Asbestos (asbestos NESHAP), 40 CFR part 61, subpart M. 55 FR 48406. Since the publication of this revision, EPA has received several inquiries from municipalities regarding whether the ``residential building exemption'' from the asbestos NESHAP applies to the demolition or renovation of isolated residential buildings with four or fewer dwelling units (``small residential buildings'') that have been declared safety hazards or public nuisances by local governments. EPA is publishing this notice to clarify that, in EPA's opinion, the demolition or renovation of an isolated small residential building by any entity is not covered by the asbestos NESHAP. This notice does not affect EPA's policy regarding demolition by fire. However, EPA also believes that the demolition or renovation of multiple (more than one) small residential buildings on the same site by the same owner or operator (or owner or operator under common control) is covered by the asbestos NESHAP.

FOR FURTHER INFORMATION CONTACT:

Mr. Tom Ripp, United States Environmental Protection Agency (2223A),
401 M Street, SW., Washington, DC 20460, telephone (202) 564-7003.

SUPPLEMENTARY INFORMATION: This clarification does not supersede, alter, or in any way replace the existing Asbestos NESHAP. This notice is intended solely as guidance and does not represent an action subject to judicial review under section 307(b) of the Clean Air Act or section 704 of the Administrative Procedure Act.

I. The Asbestos NESHAP and the ``Residential Building Exemption''

On April 6, 1973, the Agency published its initial NESHAP for asbestos (38 FR 8820) after determining that asbestos was associated with asbestosis and certain cancers. The initial asbestos NESHAP covered ``any institutional, commercial and industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation or portion thereof * * *'' 38 FR 8829 (codified at 40 CFR 61.22(d) (1973)). The NESHAP did not cover individual residential buildings containing four or fewer dwelling units. EPA based this ``residential building exemption'' on a National Academy of Sciences' Report which stated ``[i]n general, single-family residential structures contain

only small amounts of asbestos insulation." EPA stated that apartment houses with four or fewer dwelling units were considered to be equivalent to single-family residential structures. 38 FR 8821.

Since that time, EPA has revised the asbestos NESHAP on several occasions. EPA has not substantially revised the exemption for small residential buildings. However, EPA has stated that residential buildings demolished or renovated as part of larger projects, for instance, highway construction projects, were not exempt from the NESHAP. See Letter from John S. Seitz, Director, Stationary Source Compliance Division, U.S. EPA to Thomas S. Hadden, Supervisor, Division of Air Pollution Control, Ohio EPA, dated March 15, 1989; letter from Ann Pontius, U.S. EPA Region 5 to Thomas Hadden, dated September 28, 1988; letter from David Kee, Air Section, U.S. EPA to Richard Larson, Minneapolis Housing and Redevelopment Authority, dated May 16, 1973.

II. The 1990 Revisions to the Asbestos NESHAP

On November 20, 1990, EPA published a revision to the asbestos NESHAP. 55 FR 48406. The purpose of the revision was ``to enhance enforcement and promote compliance with the current standard without altering the stringency of existing controls." Id. The revisions revised and added several definitions in order to clarify the requirements of the NESHAP. The preamble accompanying the revisions also contained clarifying information.

In particular, the 1990 revisions clarified the definition of ``facility" to include:

> *Any institutional, commercial, public, industrial, or residential structure, installation, or building (including any structure, installation or building containing condominiums or individual dwelling units operated as a residential cooperative, but excluding residential buildings having four or fewer dwelling units) * * **

The 1990 amendments also added a definition of ``installation" that stated:

> *Installation means any building or structure or any group of buildings or structures at a single demolition or renovation site that are under the control of the same owner or operator (or owner or operator under common control).*

Id. (codified at 40 CFR 61.141). In responding to comments regarding the ``residential building exemption," the preamble noted that:

> *EPA does not consider residential structures that are demolished as part of a commercial or public project to be exempt from this rule. For example, the demolition of one or more houses as part of an urban renewal project, a highway construction project, or a project to develop a shopping mall, industrial facility, or other private development would be subject to the NESHAP. * * * The owner of a home that renovates his house or demolishes it to construct another house is not to be subject to the NESHAP.*

Id. at 48412.[1] Further, in response to a comment asking whether a group of residential buildings at one location would be covered by the rule, the preamble stated:

> *A group of residential buildings under the control of the same owner or operator is considered an installation according to the definition of ``installation" and is therefore covered by the rule.*

III. Programs to Demolish or Renovate Residential Buildings

Since the publication of the 1990 revisions to the asbestos NESHAP, certain questions have arisen regarding whether demolitions or renovations of residential homes that are demolished or renovated by municipalities for reasons of public health, welfare or safety (``nuisance abatement demolitions'') are covered by the asbestos NESHAP. [2] Several municipalities have stated that they believe such demolitions or renovations to be excluded from the NESHAP under the residential building exemption. Municipalities have also stated that EPA officials have been inconsistent in their determinations of this issue. In particular, officials from several municipalities in Florida have asked EPA to issue a notice clarifying EPA's interpretation of the asbestos NESHAP with regard to this issue. In addition, the House of Representatives Report accompanying H.R. 4624 (House Report 103-555, reported by the House Appropriations Committee), also noted these allegedly inconsistent interpretations and directed EPA to issue a notice of clarification that a nuisance abatement demolition or renovation does not subject an otherwise exempt structure to the asbestos NESHAP regulations. In an effort to clarify this issue for the regulated community, EPA is presenting this notice giving its interpretation of the NESHAP with regard to this issue.

IV. EPA Interpretation

EPA believes that individual small residential buildings that are demolished or renovated are not covered by the asbestos NESHAP. This is true whether the demolition or renovation is performed by agents of the owner of the property or whether the demolition or renovation is performed by agents of the municipality. EPA believes that the residential building exemption applies equally to an individual small residential building regardless of whether a municipality is an ``owner or operator'' for the purposes of the demolition or renovation. EPA believes that the exemption is based on the type of building being demolished or renovated and the type of demolition or renovation project that is being undertaken, not the entity performing or controlling the demolition or renovation. However, EPA believes that the residential building exemption does not apply where multiple (more than one) small residential buildings on the same site [3] are demolished or renovated by the same owner or operator as part of the same project or where a single residential building is demolished or renovated as part of a larger project that includes demolition or renovation of non-residential buildings. The definition of facility specifically includes ``any residential structure, installation or building'' but excludes only ``residential buildings having four or fewer dwelling units'' [emphasis added]. Id. at 48415. Specifically not excluded from the definition of facility were residential installations. EPA believes that the fact that the residential building exemption is limited to residential buildings, and does not include residential installations, shows that the residential building exemption was not designed to exempt from the NESHAP demolitions or renovations of multiple buildings at a single site by the same owner or operator. Moreover, to the extent the regulations are ambiguous, EPA believes the language of the preamble to the 1990 regulations quoted above makes clear that the Agency interpreted the residential building exemption not to include the demolition of a group of residential buildings on the same site under the control of the same owner or operator. The preamble also notes that demolitions of residential buildings as a part of larger demolition projects (e.g. construction of a shopping mall) are not excluded from the NESHAP. EPA believes that this interpretation is consistent with the original purpose of the residential building exemption, which was to exempt demolitions or renovations involving small amounts of asbestos. EPA does not believe the residential building exemption was designed to exempt larger demolitions or renovations on a particular site, even where small residential buildings are involved. [4]

While this notice clarifies EPA's belief that certain demolitions or renovations performed by municipalities are not subject to the asbestos NESHAP, EPA encourages municipalities (and other owners and operators) to perform such demolitions or renovations in a manner that provides appropriate consideration for any potential adverse health impacts to the public. This notice applies only to the Federal asbestos NESHAP. Other Federal, State or local agency regulations may apply.

Dated: July 17, 1995.

Richard Wilson,

Acting Assistant Administrator for Air and Radiation.
[FR Doc. 95-18620 Filed 7-27-95; 8:45 am]

Footnotes

[1] *EPA considers demolitions planned at the same time or as part of the same planning or scheduling period to be part of the same project. In the case of municipalities, a scheduling period is often a calendar year or fiscal year or the term of a contract.*

[2] *Demolition of such homes typically occur after a municipality orders a building condemned for public health or safety reasons (e.g. condemnation of a building that is abandoned and/or in danger of collapse). This type of demolition does not include demolitions of buildings for the purpose of building public facilities like highways or sports arenas.*

[3] *The term ``site'' is not defined in the regulations and EPA does not intend to provide any determination of the boundaries of a ``site'' in today's clarification. However, to provide guidance, EPA notes that a ``site'' should be a relatively compact area. In EPA's view, an entire municipality, or even a neighborhood in a municipality, should not be considered a single site. Where an area is made up of multiple parcels of land owned and operated by various parties, EPA believes that parcels on the same city block may be considered as a single site. (Where a site can not be easily defined as a city block, the site should be a comparably compact site. In any event, the local government should use common sense when applying this guide.) Obviously, EPA believes that if a demolition project involves the demolition of several contiguous city blocks, the entire area could be considered a site. However, EPA believes that demolition of two individual residences separated by several city blocks should not be considered a demolition on a single site. In EPA's view, the area of a site may be larger where the area is owned and operated as a unitary area by a single owner/operator (e.g. a shopping mall or amusement park).*

[4] *EPA notes that 40 CFR 61.19 forbids owners and operators from attempting to circumvent any NESHAPs by carrying out an operation in a piecemeal fashion to avoid coverage by a standard that applies only to operations larger than a specified size.*

refinery equipment; Manufacture of synthesized pharmaceutical products; Mmanufacture of pneumatic rubber tires; Automobile and light duty truck manufacturing; Fire truck and emergency response vehicle manufacturing; Manufacture of high-density polyethylene, polypropylene, and polystyrene resins, a.k.a. polymer manufacturing; Leaks from synthetic organic chemical and polymer manufacturing equipment; Air oxidation processes at synthetic organic chemical manufacturing industries; and Equipment leaks from natural gas/gasoline processing plants. These negative declarations are approved into the Wisconsin ozone SIP.

(B) On June 30, 1994, Wisconsin submitted a list of facilities subject to the post-enactment source categories listed in Appendix E to the General Preamble. 57 FR 18070, 18077 (April 28, 1992). The list included facilities covered by the source categories cleanup solvents, offset lithography, plastic parts coating, and wood furniture coating. This list is approved into the Wisconsin ozone SIP.

[FR Doc. 95–18523 Filed 7–27–95; 8:45 am]
BILLING CODE 6560–50–P

40 CFR Part 61

[FRL–5266–2]

Asbestos NESHAP Clarification of Intent

AGENCY: Environmental Protection Agency.

ACTION: Notice of clarification.

SUMMARY: On November 20, 1990, the **Federal Register** published the Environmental Protection Agency's (the Agency's) revision of the National Emission Standard for Hazardous Air Pollutants for Asbestos (asbestos NESHAP), 40 CFR part 61, subpart M. 55 FR 48406. Since the publication of this revision, EPA has received several inquiries from municipalities regarding whether the ''residential building exemption'' from the asbestos NESHAP applies to the demolition or renovation of isolated residential buildings with four or fewer dwelling units (''small residential buildings'') that have been declared safety hazards or public nuisances by local governments. EPA is publishing this notice to clarify that, in EPA's opinion, the demolition or renovation of an isolated small residential building by any entity is not covered by the asbestos NESHAP. This notice does not affect EPA's policy regarding demolition by fire. However, EPA also believes that the demolition or renovation of multiple (more than one) small residential buildings on the same site by the same owner or operator (or owner or operator under common control) is covered by the asbestos NESHAP.

FOR FURTHER INFORMATION CONTACT: Mr. Tom Ripp, United States Environmental Protection Agency (2223A), 401 M Street, SW., Washington, DC 20460, telephone (202) 564–7003.

SUPPLEMENTARY INFORMATION: This clarification does not supersede, alter, or in any way replace the existing Asbestos NESHAP. This notice is intended solely as guidance and does not represent an action subject to judicial review under section 307(b) of the Clean Air Act or section 704 of the Administrative Procedure Act.

I. The Asbestos NESHAP and the ''Residential Building Exemption''

On April 6, 1973, the Agency published its initial NESHAP for asbestos (38 FR 8820) after determining that asbestos was associated with asbestosis and certain cancers. The initial asbestos NESHAP covered ''any institutional, commercial and industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation or portion thereof * * *'' 38 FR 8829 (codified at 40 CFR 61.22(d) (1973)). The NESHAP did not cover individual residential buildings containing four or fewer dwelling units. EPA based this ''residential building exemption'' on a National Academy of Sciences' Report which stated ''[i]n general, single-family residential structures contain only small amounts of asbestos insulation.'' EPA stated that apartment houses with four or fewer dwelling units were considered to be equivalent to single-family residential structures. 38 FR 8821.

Since that time, EPA has revised the asbestos NESHAP on several occasions. EPA has not substantially revised the exemption for small residential buildings. However, EPA has stated that residential buildings demolished or renovated as part of larger projects, for instance, highway construction projects, were not exempt from the NESHAP. *See* Letter from John S. Seitz, Director, Stationary Source Compliance Division, U.S. EPA to Thomas S. Hadden, Supervisor, Division of Air Pollution Control, Ohio EPA, dated March 15, 1989; letter from Ann Pontius, U.S. EPA Region 5 to Thomas Hadden, dated September 28, 1988; letter from David Kee, Air Section, U.S. EPA to Richard Larson, Minneapolis Housing and Redevelopment Authority, dated May 16, 1973.

II. The 1990 Revisions to the Asbestos NESHAP

On November 20, 1990, EPA published a revision to the asbestos NESHAP. 55 FR 48406. The purpose of the revision was ''to enhance enforcement and promote compliance with the current standard without altering the stringency of existing controls.'' *Id.* The revisions revised and added several definitions in order to clarify the requirements of the NESHAP. The preamble accompanying the revisions also contained clarifying information.

In particular, the 1990 revisions clarified the definition of ''facility'' to include:

> Any institutional, commercial, public, industrial, or residential structure, installation, or building (including any structure, installation or building containing condominiums or individual dwelling units operated as a residential cooperative, but excluding residential buildings having four or fewer dwelling units) * * *

Id. at 48415 (codified at 40 CFR 61.141). The 1990 amendments also added a definition of ''installation'' that stated:

> Installation means any building or structure or any group of buildings or structures at a single demolition or renovation site that are under the control of the same owner or operator (or owner or operator under common control).

Id. (codified at 40 CFR 61.141). In responding to comments regarding the ''residential building exemption,'' the preamble noted that:

> EPA does not consider residential structures that are demolished as part of a commercial or public project to be exempt from this rule. For example, the demolition of one or more houses as part of an urban renewal project, a highway construction project, or a project to develop a shopping mall, industrial facility, or other private development would be subject to the NESHAP. * * * The owner of a home that renovates his house or demolishes it to construct another house is not to be subject to the NESHAP.

Id. at 48412.[1] Further, in response to a comment asking whether a group of residential buildings at one location would be covered by the rule, the preamble stated:

> A group of residential buildings under the control of the same owner or operator is considered an installation according to the definition of ''installation'' and is therefore covered by the rule.

[1] EPA considers demolitions planned at the same time or as part of the same planning or scheduling period to be part of the same project. In the case of municipalities, a scheduling period is often a calendar year or fiscal year or the term of a contract.

Id.

III. Programs to Demolish or Renovate Residential Buildings

Since the publication of the 1990 revisions to the asbestos NESHAP, certain questions have arisen regarding whether demolitions or renovations of residential homes that are demolished or renovated by municipalities for reasons of public health, welfare or safety (''nuisance abatement demolitions'') are covered by the asbestos NESHAP.[2] Several municipalities have stated that they believe such demolitions or renovations to be excluded from the NESHAP under the residential building exemption. Municipalities have also stated that EPA officials have been inconsistent in their determinations of this issue. In particular, officials from several municipalities in Florida have asked EPA to issue a notice clarifying EPA's interpretation of the asbestos NESHAP with regard to this issue. In addition, the House of Representatives Report accompanying H.R. 4624 (House Report 103–555, reported by the House Appropriations Committee), also noted these allegedly inconsistent interpretations and directed EPA to issue a notice of clarification that a nuisance abatement demolition or renovation does not subject an otherwise exempt structure to the asbestos NESHAP regulations. In an effort to clarify this issue for the regulated community, EPA is presenting this notice giving its interpretation of the NESHAP with regard to this issue.

IV. EPA Interpretation

EPA believes that individual small residential buildings that are demolished or renovated are not covered by the asbestos NESHAP. This is true whether the demolition or renovation is performed by agents of the owner of the property or whether the demolition or renovation is performed by agents of the municipality. EPA believes that the residential building exemption applies equally to an individual small residential building regardless of whether a municipality is an ''owner or operator'' for the purposes of the demolition or renovation. EPA believes that the exemption is based on the type of building being demolished or renovated and the type of demolition or renovation project that is being undertaken, not the entity performing or controlling the demolition or renovation.

However, EPA believes that the residential building exemption does not apply where multiple (more than one) small residential buildings on the same site[3] are demolished or renovated by the same owner or operator as part of the same project or where a single residential building is demolished or renovated as part of a larger project that includes demolition or renovation of non-residential buildings. The definition of facility specifically includes ''any residential structure, installation or building'' but excludes only ''residential *buildings* having four or fewer dwelling units'' [emphasis added]. *Id.* at 48415. Specifically not excluded from the definition of facility were residential *installations.* EPA believes that the fact that the residential building exemption is limited to residential *buildings*, and does not include residential *installations*, shows that the residential building exemption was not designed to exempt from the NESHAP demolitions or renovations of multiple buildings at a single site by the same owner or operator. Moreover, to the extent the regulations are ambiguous, EPA believes the language of the preamble to the 1990 regulations quoted above makes clear that the Agency interpreted the residential building exemption not to include the demolition of a group of residential buildings on the same site under the control of the same owner or operator. The preamble also notes that demolitions of residential buildings as a part of larger demolition projects (e.g. construction of a shopping mall) are not excluded from the NESHAP. EPA believes that this interpretation is consistent with the original purpose of the residential building exemption, which was to exempt demolitions or renovations involving small amounts of asbestos. EPA does not believe the residential building exemption was designed to exempt larger demolitions or renovations on a particular site, even where small residential buildings are involved.[4]

While this notice clarifies EPA's belief that certain demolitions or renovations performed by municipalities are not subject to the asbestos NESHAP, EPA encourages municipalities (and other owners and operators) to perform such demolitions or renovations in a manner that provides appropriate consideration for any potential adverse health impacts to the public. This notice applies only to the Federal asbestos NESHAP. Other Federal, State or local agency regulations may apply.

Dated: July 17, 1995.

Richard Wilson,

Acting Assistant Administrator for Air and Radiation.

[FR Doc. 95–18620 Filed 7–27–95; 8:45 am]

BILLING CODE 6560–50–P

[2] Demolition of such homes typically occur after a municipality orders a building condemned for public health or safety reasons (e.g. condemnation of a building that is abandoned and/or in danger of collapse). This type of demolition does not include demolitions of buildings for the purpose of building public facilities like highways or sports arenas.

[3] The term ''site'' is not defined in the regulations and EPA does not intend to provide any determination of the boundaries of a ''site'' in today's clarification. However, to provide guidance, EPA notes that a ''site'' should be a relatively compact area. In EPA's view, an entire municipality, or even a neighborhood in a municipality, should not be considered a single site. Where an area is made up of multiple parcels of land owned and operated by various parties, EPA believes that parcels on the same city block may be considered as a single site. (Where a site can not be easily defined as a city block, the site should be a comparably compact site. In any event, the local government should use common sense when applying this guide.) Obviously, EPA believes that if a demolition project involves the demolition of several contiguous city blocks, the entire area could be considered a site. However, EPA believes that demolition of two individual residences separated by several city blocks should not be considered a demolition on a single site. In EPA's view, the area of a site may be larger where the area is owned and operated as a unitary area by a single owner/operator (e.g. a shopping mall or amusement park).

[4] EPA notes that 40 CFR 61.19 forbids owners and operators from attempting to circumvent any NESHAPs by carrying out an operation in a piecemeal fashion to avoid coverage by a standard that applies only to operations larger than a specified size.

40 CFR Part 81

[UT22–1–6925a; FRL–5265–5]

Designation of Area for Air Quality Planning Purposes; Utah; Designation of Ogden City PM_{10} Nonattainment Area

AGENCY: Environmental Protection Agency (EPA).

ACTION: Direct final rule.

SUMMARY: In this notice, EPA is revising the PM_{10} (particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers) National Ambient Air Quality Standards (NAAQS) designation for Ogden City, a portion of Weber County, Utah. Previously, consistent with section 107(d)(3)(A) of the Act, EPA notified the Governor of Utah that Weber County, Utah should be redesignated from unclassifiable to nonattainment for PM_{10}. The redesignation is based upon violations of the PM_{10} NAAQS which were monitored between January 1991 and January 1993.

DATES: This final rule will become effective on September 26, 1995 unless adverse comments are received by August 28, 1995. If the effective date is delayed, timely notice will be published in the **Federal Register**.

Common Questions On The Asbestos NESHAP

United States
Envrionmental Protection Agency
Office Of Air Quality Planning and Standards
Stationary Source Compliance Division

December 1990

DISCLAIMER

This manual was prepared by Entropy Environmentalist, Inc. for the Stationary Source Compliance Division of the U.S. Environmental Protection Agency. It has been completed in accordance with EPA Contract No. 68-02-4462, Work Assignment No. 90-123. This document is intended for information purposes **ONLY**, and may not in any way be interpreted to alter or replace the coverage or requirements of the asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 61, Subpart M. Any mention of product names does not constitute endorsement by the U.S. Environmental Protection Agency.

Common Questions on the Asbestos NESHAP

Contents

Introduction 1

General Information 2

NESHAP Jurisdiction 3

Notifications 6

Removal 9

Ordered Demolitions 10

Friable and Non-Friable Asbestos 11

Transport and Disposal 12

Monitoring and Sampling 14

Inspections 15

Training 17

Violations and Penalties 17

NARS 19

Additional Information 21

Glossary of Terms 22

AHERA and NESHAP Coordinators 24

December 1990

Common Questions on the Asbestos NESHAP

Introduction

The Clean Air Act (CAA) requires the U. S. Environmental Protection Agency (EPA) to develop and enforce regulations to protect the general public from exposure to airborne contaminants that are known to be hazardous to human health. In accordance with Section 112 of the CAA, EPA established National Emissions Standards for Hazardous Air Pollutants (NESHAP) to protect the public. Asbestos was one of the first hazardous air pollutants regulated under Section 112. On March 31, 1971, EPA identified asbestos as a hazardous pollutant, and on April 6, 1973, EPA first promulgated the Asbestos NESHAP in 40 CFR Part 61.

In 1990, a revised NESHAP regulation was promulgated by EPA. Information contained in this pamphlet is consistent with the amended regulation.

This pamphlet answers the most commonly asked questions about the Asbestos NESHAP for demolitions and renovations. Many of the questions included in this pamphlet have been raised by demolition and renovation contractors in recent years. Most questions relate to how a demolition or renovation contractor or building owner can best comply with the regulation. The responses assume that the questioner has a basic understanding of the Asbestos NESHAP and demolition and renovation practices. A brief glossary of terms is also included at the back of the pamphlet.

The Asbestos NESHAP regulations protect the public by minimizing the release of asbestos fibers during activities involving the processing, handling, and disposal of asbestos-containing material. Accordingly, the Asbestos NESHAP specifies work practices to be followed during demolitions and renovations of all structures, installations, and buildings (excluding residential buildings that have four or fewer dwelling units). In addition, the regulations require the owner of the building and/or the contractor to notify applicable State and local agencies and/or EPA Regional Offices before all demolitions, or before renovations of buildings that contain a certain threshold amount of asbestos.

For more information about the Asbestos NESHAP or for answers to questions not covered in this pamphlet, contact the delegated State or local agency or the appropriate EPA Regional Office listed on page 24.

General Information

What is the purpose of the Asbestos NESHAP regulation?

The purpose is to protect the public health by minimizing the release of asbestos when facilities which contain asbestos-containing materials (ACMs) are demolished or renovated.

How much regulated asbestos-containing material (RACM) is disposed of annually from demolition/renovation operations?

Approximately 5.7 million cubic feet of RACM is disposed of annually. In accordance with the regulation, most RACM is taken to landfills, where it is covered by soil or other debris in order to keep it from releasing asbestos fibers.

What is the difference between demolishing a facility and renovating it?

"Demolition" and "renovation" are defined in the regulation. You "demolish" a facility when you remove or wreck any load-supporting structural member of that facility or perform any related operations; you also "demolish" a facility when you burn it. You "renovate" a facility when you alter any part of that facility in any other manner. Renovation includes stripping or removing asbestos from the facility.

What percentage of asbestos related activities involve demolitions?

Demolitions comprise approximately 10% of all reported asbestos-related activities.

Is there a numeric emission limit for the release of asbestos fibers during renovations or demolitions in the asbestos NESHAP regulation?

No, the Asbestos NESHAP relating to demolitions or renovations is a work practice standard. This means that it does not place specific numerical emission limitations for asbestos fibers on asbestos demolitions and removals. Instead, it requires specific actions be taken to control emissions. However, the Asbestos NESHAP does specify zero visible emissions to the outside air from activity relating to the transport and disposal of asbestos waste.

Who is responsible for enforcing the Asbestos NESHAP standards?

Under Section 112 of the Clean Air Act, Congress gave EPA the responsibility for enforcing regulations relating to asbestos renovations and demolitions. The CAA allows EPA to delegate this authority to State and local agencies. Even after EPA delegates responsibility to a State or local agency, EPA retains the authority to oversee agency performance and to enforce NESHAP regulations as appropriate.

How many States have primary responsibility for implementing the Asbestos NESHAP regulations?

As of October 1990, approximately 45 states.

NESHAP Jurisdiction

What is a "facility?"

As defined in the regulation, a "facility" is any institutional, commercial, public, industrial or residential structure, installation or building (including any structure, installation or building containing condominiums, or individual dwelling units operated as a residential cooperative, but excluding residential buildings having four or fewer dwelling units); any ship; or any active or inactive waste disposal site. Any building, structure or installation that contains a loft used as a dwelling is not considered residential. Any structure, installation, or building that was previously subject to the Asbestos NESHAP is not excluded, regardless of its current use or function.

If I renovate several two-family units, are the units defined as a "facility?"

Residential buildings which have four or fewer dwelling units are not considered "facilities" unless they are part of a larger installation (for example, an army base, company housing, apartment or housing complex, part of a group of houses subject to condemnation for a highway right-of-way, an apartment which is an integral part of a commercial facility, etc.).

Are mobile homes or mobile structures regulated by the Asbestos NESHAP?

Mobile homes used as single-family dwellings are not subject to Asbestos NESHAP. Mobile structures used for non-residential purposes are subject to NESHAP.

Are Federal facilities regulated by the Asbestos NESHAP?

Yes.

Are single-family private residences regulated by the Asbestos NESHAP?

No.

How much asbestos must be present before the Asbestos NESHAP work practice standards apply to renovation projects?

Asbestos NESHAP regulations must be followed for all renovations of facilities with at least 80 linear meters (260 linear feet) of regulated asbestos-containing materials (RACM) on pipes, or 15 square meters (160 square feet) of regulated asbestos-containing materials on other facility components, or at least one cubic meter (35 cubic feet) off facility components where the amount of RACM previously removed from pipes and other facility components could not be measured before stripping. These amounts are known as the "threshold" amounts.

How much asbestos must be present before the Asbestos NESHAP work practice standards apply to demolition projects?

Asbestos NESHAP regulations must be followed for demolitions of facilities with at least 80 linear meters (260 linear feet) of regulated asbestos-containing materials (RACM) on pipes, 15 square meters (160 square feet) of regulated asbestos-containing materials on other facility components, or at least one cubic meter (35 cubic feet) off facility components where the amount of RACM previously removed from pipes and other facility components could not be measured before stripping.

However, all demolitions must notify the appropriate regulatory agency, even if no asbestos is present at the site, and all demolitions and renovations are "subject" to the Asbestos NESHAP insofar as owners and operators must determine if and how much asbestos is present at the site.

Are homes that are demolished or renovated to build non-residential structures regulated by the Asbestos NESHAP?

Yes. For example, homes which are demolished as part of an urban renewal project, a highway construction project, or a project to develop a shopping mall are regulated by the Asbestos NESHAP.

A single home which is converted into a non-residential structure is also regulated by the Asbestos NESHAP. For example, if someone buys a house and converts it into a store, the renovation is subject to the Asbestos NESHAP.

If a renovation site is abandoned, is the site still regulated by the Asbestos NESHAP?

Yes. Even after a renovation site is abandoned, it is still regulated by the Asbestos NESHAP.

What is encapsulation, and is it regulated by the Asbestos NESHAP?

Encapsulation is the application of a material with a sealant to stop it from releasing fibers. Normally, encapsulation is not regulated by the Asbestos NESHAP unless it involves removing or stripping asbestos. However, if encapsulation is done using methods that damage asbestos and release fibers it would be covered. For example, high pressure spraying to apply encapsulant could damage asbestos. Also, if friable RACM is encapsulated, the RACM is still covered by the Asbestos NESHAP if renovation or demolition occurs.

Are offshore oil rigs regulated in terms of asbestos removal and demolition?

Yes. Federal jurisdiction extends to the continental shelf (100 miles). When EPA delegates authority to State or local agencies, the State and local agencies are usually considered to have authority only in territorial waters (12 miles). The Department of the Interior is still evaluating whether States may extend their jurisdiction beyond territorial waters. EPA currently enforces the NESHAP between territorial waters and the continental shelf.

Notifications

What is a notification?

A notification is a written notice of intent to renovate or demolish. Notifications must contain certain specified information, including but not limited to, the scheduled starting and completion date of the work, the location of the site, the names of operators or asbestos removal contractors, methods of removal and the amount of asbestos, and whether the operation is a demolition or renovation.

See Section §61.145(b) of the Asbestos NESHAP regulation.

Whom do I notify?

You should notify the delegated State/Local Pollution Control Agency in your area and/or the EPA Regional Office of the demolition or renovation operations subject to NESHAP. Some EPA Regions require that both the EPA Regional Office and the local delegated agency be notified, while some require notice only to the delegated State or local agency. If the program is not delegated, notify the EPA Regional Office.

How do I notify?

Mail or hand-deliver the notification to the appropriate agency.

Are telefaxed or telephone notifications acceptable?

No. Telefaxed notifications are not accepted. Telephone notifications are only acceptable in emergency situations at the discretion of the EPA Regional Office or delegated agency and must be followed with a written copy by the following working day.

Who is responsible for submitting a notification -- the owner of the building which is being demolished or renovated, or the contractor?

The NESHAP regulation states that either the owner of the building or operator of the demolition or renovation operation can submit the notification. Usually, the two parties decide together who will notify. If neither provide adequate notice, EPA can hold either or both parties liable.

When a condominium complex is being renovated, who as owner, is responsible for submitting a notification?

While owners and operators share responsibility for proper notification, the condominium or co-op board is responsible as the owner. The board should ensure that they are told when work takes place on individual units, so that they can comply with notification (and other EPA) requirements, especially if multiple operators are involved.

Is there a form or format for notifications?

Yes, there is a suggested form for notifications. You can obtain a form, and instructions on how to fill it out, from your delegated State or local agency or from your EPA Regional Office.

Do demolitions of facilities in which no asbestos is present require notification?

Yes. All demolitions that meet the definition of facility must notify.

When I notify regarding a renovation, what date do I consider the start date?

For a renovation, the start date is the day that the removal of asbestos-containing material, or any other asbestos-handling activities, including precleaning, construction of containment, or other activities that could disturb the asbestos, will begin.

When I notify regarding a demolition, do I give the start date of the demolition or of the asbestos removal? Which date do I use to determine whether I've met the 10-day waiting period?

For a demolition, the start date is the date that the removal or related activity begins. The date the demolition starts also must be reported. The waiting period should be calculated based on the start date of the removal or the demolition, if no removal is required. The waiting period is necessary to give inspectors time to visit the site before activity begins.

Does the 10-day notification requirement refer to "calendar" days or "working" days?

The Asbestos NESHAP regulation specifies "working days." Holidays that fall between Monday and Friday count as "working days."

What is a "nonscheduled renovation operation"?

A "nonscheduled renovation operation" is a renovation operation that is caused by the routine failure of equipment which is expected to occur based on past operating experience, but for which an exact date cannot be predicted.

Do I have to notify for non-scheduled operations? When?

Yes, if you can predict based on past experience that renovations will be necessary during the calendar year and the amount of asbestos is likely to exceed the jurisdictional amount, notification is required. This notification must be submitted at least 10 working days before the end of the calendar year preceding the year for which notice is being given.

Note: Single renovation projects which exceed the threshold amount are not covered by this type of notice. A separate notification is required for these projects.

Must I notify the agency again if I know that a specific renovation project involving more than the threshold amount (including the work covered by the calendar year notice for non-scheduled operations) is about to occur at a specific time?

Yes.

What constitutes an emergency renovation?

An emergency renovation is a renovation that was not planned, but results from a sudden, unexpected event that either immediately produces unsafe conditions, or that, if not quickly remedied, could be reasonably foreseen to result in an unsafe or detrimental effect on health or is necessary to protect equipment and avoid unreasonable financial burden. The term includes renovations necessitated by non-routine equipment failures. For example, the explosion of a boiler in a chemical plant might require emergency renovations, since such an explosion would disrupt

normal operations. However, renovations involving routine repairs are not emergencies.

Under what conditions must I notify for emergency renovations? When must I notify?

First, inspect the facility and determine the amount of RACM that may have to be removed or disturbed to repair the facility. (If you don't have the time to have samples analyzed, you should assume that all insulation is RACM.) Then, if the amount of RACM is in excess of the threshold amount, you should mail or deliver a notification as soon as possible, but certainly no later than the following workday. A notification which is postmarked more than one working day after the emergency will be considered in violation of the notification requirements. EPA recommends that you send the notice by overnight express mail, and that you phone in a notification as well to the delegated agency and/or EPA Regional Office.

When does a notification need to be revised?

A notification must be revised if information contained in the original notice has changed. For example, you must revise the notification if you change the start date of an operation. If the change relates to the amount of RACM involved, you need only revise the notification if the amount changes by more than 20 percent.

When do I submit a revised notification?

You should telephone EPA as soon as possible after you realize the revision is necessary, and should then mail or hand deliver a written notice. If you delay the start date of a project, EPA must receive the revised notification no later than the original start date. If you plan to begin work before the date specified in the original notice, EPA must receive the revised notice at least 10 working days before the revised start date.

Removal

Does the Asbestos NESHAP require a building owner or operator to remove damaged or deteriorating asbestos-containing material?

No. Not unless a renovation of the facility is planned which would disturb the ACM and it exceeds the threshold amount.

What does "adequately wet" mean?

To "adequately wet" ACM means to sufficiently mix or penetrate the material with liquid to prevent the release of particulates. If visible emissions are observed coming from ACM, then the material has not been adequately wetted. However, the absence of visible emissions is not evidence of being adequately wet.

If a contractor puts water in the bottom of a bag, then strips the friable asbestos material dry and lets it fall into the water, is this a violation of the Asbestos NESHAP standards?

Yes. The regulation states that friable asbestos-containing material must be "adequately wet" during stripping operations. The material must remain wet until disposal.

Section 61.145(c)(6)(iii) states that the operator must "transport the materials to the ground via dust tight chutes or containers if it has been removed or stripped more than 50 feet above ground level." Can a room sealed with plastic and a negative air system be considered a dust tight chute?

No, the area in which removal is being conducted (the containment area) cannot be considered a dust tight chute in order to comply with §61.145(c)(6)(iii).

Ordered Demolitions

If a facility is being demolished under an order of a State or local government because the facility is structurally unsound, and therefore unsafe, do all the normal regulations covering demolitions apply?

No. The regulations which do apply are specified in §61.145 (a)(3) of the regulation.

If a facility is being demolished under an order of a State or local government, must all the debris be treated as asbestos-contaminated waste?

If, for safety reasons, the RACM in the facility is not removed prior to demolition, the RACM must be kept adequately wet during the wrecking operations. After wrecking, all the contaminated debris must be kept adequately wet until disposal.

All contaminated debris which cannot be segregated and cleaned should be disposed of as asbestos waste.

Friable and Non-Friable Asbestos

What is friable asbestos-containing material?

Friable ACM is any material containing more than one percent asbestos (as determined by Polarized Light Microscopy) that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure.

What is non-friable ACM?

Non-friable ACM is any material containing more than one percent asbestos (as determined by Polarized Light Microscopy) that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure. Under the Asbestos NESHAP, non-friable ACM is divided into two categories. Category I non-friable ACM are asbestos-containing resilient floor coverings (commonly known as vinyl asbestos tile (VAT)), asphalt roofing products, packings and gaskets. These materials rarely become friable. All other non-friable ACM are considered category II non-friable ACM.

Must I remove category I non-friable material prior to demolition or renovation?

Under normal circumstances, category I non-friable materials need not be removed prior to demolition or renovation, because generally these materials do not release significant amounts of asbestos fibers, even when damaged. This is not, however, a hard and fast rule. If category I materials have become friable or are in poor condition, they must be removed. Also, if you sand, grind, abrade, drill, cut or chip any non-friable materials, including category I materials, you must treat the material as friable, if more than the jurisdictional amount is involved.

Must I remove category II non-friable materials prior to demolition or renovation?

These materials should be evaluated on a case-by-case basis. If category II non-friable materials are likely to become crushed, pulverized or reduced to powder during demolition or renovation, they should be removed before demolition or renovation begin. For example, A/C (asbestos cement) siding on a building that is

going to be demolished with a wrecking ball should be removed, because it is likely that the siding will be pulverized by the wrecking ball.

Does non-friable waste, if broken, damaged, etc., have to be wetted and contained?

Non-friable ACM that has been damaged during a demolition or renovation operation such that some portions of the material are crumbled, pulverized or reduced to powder is covered by the Asbestos NESHAP if the facility contains more than the threshold amount of RACM. However, category II non-friable ACM that has a high probability of being damaged by the demolition or renovation forces expected to act on the materials such that it will be crumbled, pulverized, or reduced to powder must be removed prior to the demolition or renovation operation. It is the owner's or operator's responsibility to make these determinations.

Transport and Disposal

How should I handle bulk waste from a facility that contained RACM and that was not found until after demolition began?

The demolition debris must be treated as asbestos-containing waste. Adequately wet the demolition debris until collected for disposal and during loading, transport it in covered vehicles and emit no visible emissions to the outside air as required by §61.150. The waste must be deposited at an acceptable waste disposal site.

Can I transport bulk asbestos waste without placing it in containers as long as I keep the waste pile wet?

No. After wetting, seal all asbestos-containing waste material in leak-tight containers while wet and label with the appropriate signs and labels. If the waste will not fit into containers, it must be placed in leak-tight wrapping.

However, for facilities that are demolished without removing the RACM and for ordered demolitions, the material must be adequately wet after the demolition has occurred and again when loading the material for transport to a disposal site. RACM covered by this paragraph may be transported in bulk without being placed in leak-tight containers or wrapping.

How should I label asbestos-containing waste that is being taken away from the facility?

You should label the containers or wrapped materials with the name of the waste generator and the location at which the waste was generated. An OSHA warning label must also be used.

Does EPA license landfills for asbestos waste?

The EPA does not license asbestos landfills under the Clean Air Act.. However, it has established asbestos disposal requirements for active and inactive disposal sites under the NESHAP, and general requirements for solid waste disposal under the Resource Conservation and Recovery Act (RCRA). In addition, State and/or local agencies usually require asbestos landfills to be approved or licensed.

Where can I obtain a list of licensed landfills?

State and local agencies which require handling or licensing procedures can supply a list of "approved" or licensed asbestos disposal sites upon request. Solid waste control agencies are listed in local telephone directories under State, county or city headings.

What should the owner or operator of a waste disposal site do if it is determined that there is a discrepancy between the amount of waste that left the facility and the amount of waste that was delivered to the site?

The waste site owner or operator must contact the demolition/renovation owner or operator, and attempt to reconcile the discrepancy. If they cannot do so within 15 days after the waste was received, the waste site owner or operator must notify both the delegated agency responsible for the facility from which the waste was removed, and the delegated agency responsible for the area in which the waste was disposed.

Can water be considered "six-inch compacted non-asbestos cover"? In other words, could asbestos covered components be dropped in the ocean?

Monitoring and Sampling

Does the NESHAP regulation require air monitoring during renovation or removal?

No.

Does the Asbestos NESHAP regulation require me to inspect my property for asbestos?

No, not unless demolition or renovation is planned. The only Federal regulation which requires general inspections are the AHERA regulations, which mandate that schools must be inspected for asbestos. The NESHAP regulation requires that you inspect for asbestos before demolition or renovation.

What is the acceptable exposure/ambient air standard for asbestos?

EPA does not specify an acceptable exposure/ambient air standard.

What is a bulk sample?

A bulk sample is a solid quantity of insulation, floor tile, building material, etc., that is suspected of containing asbestos fibers that will be analyzed for the presence and quantity of asbestos.

Will EPA test my building for asbestos for me?

No. Owners and operators are responsible for getting their buildings tested.

How can I find someone to do the testing?

The National Institute of Standards and Technology (NIST) publishes a yearly listing of accredited laboratories enrolled in the National Voluntary Laboratory Accreditation Program (NVLAP). Then, on a quarterly basis NIST publishes updates to the master list detailing labs newly accredited, labs which have had their accreditation suspended, etc. Contact NIST NVLAP for a current listing of accredited labs. The NIST NVLAP number is listed at the end of this pamphlet, along with other contact numbers.

Does EPA accredit laboratories that test for asbestos?

No. EPA, under CFR Part 763, requires local education agencies to use laboratories accredited by the National Institute of Standards and Technology (NIST) in its National Voluntary Laboratory Accreditation Program (NVLAP). It is recommended for NESHAP related projects that NIST accredited laboratories be used.

How do laboratories analyze bulk samples?

Laboratories analyze bulk samples a number of ways. Most laboratories use Polarized Light Microscopy (PLM). Some laboratories use Transmission Electron Microscopy (TEM). However, there is currently no published method for bulk analysis using TEM.

How much does it cost to have a bulk sample analyzed?

The cost varies with the method. The cost of PLM analysis ranges from $20.00 to $100.00. The average cost is $30.00. TEM analysis is more expensive.

Inspections

Does an inspector have the right to enter any facility and the containment area?

Yes. All inspectors have the right under the Clean Air Act to inspect any facility and the containment area. Inspectors are trained and equipped to do this safely.

If I can see ACM dust inside the containment area or inside a glovebag, is this a violation of the Asbestos NESHAP?

The observation of ACM dust will be used as evidence of a violation of the "adequately wet" requirement. This is consistent with the definition of adequately wet that requires enough wetting "to prevent the release of particulates."

Is visible asbestos-containing debris on the ground outside a removal job considered a "visible emission," and a violation of the NESHAP?

Yes. Dry friable asbestos insulation on the ground violates the "adequately wet" requirement, and can be considered evidence of a visible emission.

Is it appropriate for an inspector to open any bags outside the designated contaminated area?

Yes. The inspector may open any bags outside the designated contaminated area to inspect them. The inspector may use a glovebag or other control techniques. The inspector will then properly reseal the bag, or request that the operator do so.

Must an inspector witness improper removal of more than 160 square feet or 260 linear feet of asbestos-containing material to prove a violation of the NESHAP regulation?

No. First, the inspector must gather information about the quantity of asbestos to prove that the project is subject to the NESHAP standards. Second, the inspector must prove that there has been improper removal. The two tasks are distinct from each other.

Are inspectors required to have medical examinations to ensure that they are medically fit to wear respirators?

Yes. Several Federal provisions under OSHA, EHSD, and NIOSH require people to be examined by a doctor and pronounced physically fit before they are permitted to wear respirators.

Must inspectors have personnel monitoring conducted on them during inspections to comply with OSHA requirements for workers?

No. The inspectors do not have to comply with the work practice safety standards required by OSHA for personnel monitoring.

Do inspectors need to follow facility training requirements including fit testing?

No.

Training

Do contractors and employees need to be accredited?

As of November 20, 1991, the Asbestos NESHAP requires a person trained in the provisions of this rule and the means of complying with them to be on-site when asbestos-containing material is stripped, removed, or disturbed. Under AHERA, all contractors and employees involved in the removal and disposal of asbestos-containing material from schools must be accredited. Additionally, many States require that all workers be accredited before they remove asbestos from any facility.

How can I qualify as an asbestos contractor/worker/consultant under AHERA?

You must attend and pass an EPA accredited training course. A list of training courses approved by EPA is published quarterly in the Federal Register, and is available through the TSCA hotline. The TSCA number is printed at the end of this pamphlet, along with other contact numbers. Contact your State or local agency for more information.

Do supervisors need to be trained?

Beginning on November 20, 1991, the Asbestos NESHAP requires at least one trained supervisor to be present at any site at which RACM is stripped, removed, or otherwise disturbed at any facility which is being demolished or renovated and is regulated by NESHAP. Evidence of the training must be posted and made available for inspection at the demolition or renovation site. Training includes, at a minimum: applicability, notification, material identification, control procedures, waste disposal, reporting and record keeping, asbestos hazards and worker protection. Completion of an AHERA accredited course constitutes adequate training. Every 2 years the trained individual is required to receive refresher training. Information about both the training and refresher courses is available through EPA or delegated State or local agencies.

Violations and Penalties

What will happen if I violate the Asbestos NESHAP?

Sanctions vary. In some cases, Notices of Deficiency (NOD) -- written warnings -- or Notices of Violation (NOV's) are issued to owners or operators who violate notification requirements. Or, depending upon the offense, EPA recommends fines up to $25,000 per day per violation.

Violators of the work practice or disposal standards may be subject to either written warnings, administrative orders or civil penalties up to $25,000 per day per violation, depending upon the seriousness of the violation. EPA may also bring criminal charges against violators. Some owners and operators who have knowingly violated the Asbestos NESHAP have been sentenced to prison terms.

For more information on penalties and enforcement, see the EPA Public Information Document entitled "Asbestos NESHAP Enforcement."

What is the maximum penalty which can be assessed for NESHAP violations?

$25,000 per day, per violation, with no absolute maximum. However, some NESHAP violators may also be liable under CERCLA, and if so, the maximum penalty may be much higher.

How are penalties calculated?

Penalties are computed on a case-by-case basis. The amount of asbestos involved, the number of previous violations, the duration of the offense, the economic benefit that accrued to the owner or operator as a result of the violation, and similar considerations are taken into account.

What is "contractor listing?"

Contractors who have shown a pattern of violation, or who have been convicted of a criminal violation, may be placed on a list of violators who are prohibited from contracting for any jobs involving Federal money (grants, contracts, sub-grants, etc.).

Can a corporation that has changed its name, but is owned by an individual who has been listed be subject to contractor listing?

Yes.

NARS

What is NARS?

NARS stands for "National Asbestos Registry System." NARS is a computerized database established by EPA in April, 1989. NARS stores data on the compliance history of firms doing demolition or renovation work subject to the Asbestos NESHAP.

What is the purpose of NARS?

NARS is used by EPA Regional Offices as well as State and local agencies to "target" inspections of contractors with poor compliance histories, and to monitor activity subject to the NESHAP regulations.

Can I get NARS information?

Yes. NARS information is available through EPA Regional Offices under the provisions of the Freedom of Information Act.

Are there any penalties for being listed in NARS as a violator?

No. NARS is only an information system. Contractors who have violations listed in NARS may, however, be inspected more frequently than contractors who have no violations.

Why does EPA recommend inspection targeting?

Delegated agencies receive over 60,000 notifications of planned renovation or demolition projects each year. Because all projects cannot be inspected, EPA recommends targeting inspections so that agencies can make better use of their inspection resources.

Can firms avoid future inspections based on past good performance?

Past performance is an important criterion for targeting inspections; however, other criteria are also used. As a result of EPA guidance to State and local air pollution agencies, many asbestos removal contractors will be inspected at least once per year.

How many contractors and owners are currently listed in NARS?

As of October 1990, there were approximately 7,000 contractors and owners in NARS.

How does information get into NARS?

Information on the number of notifications, inspections, and violations for each contractor or owner is submitted by delegated State and local air pollution agencies and is reported through the EPA Regional NARS Coordinators to EPA Headquarters where the report is compiled.

Additional Information

You can obtain more information about the Asbestos NESHAP by contacting your EPA Regional Office's NESHAP coordinator. You can obtain more information about AHERA by contacting your Regional Asbestos Coordinator (RAC). The addresses and phone numbers of both the RAC and NESHAP coordinators are listed at the end of this pamphlet.

You may also call the EPA Toxic Substances Control Act (TSCA) Hotline to ask general questions about asbestos, or to request asbestos guidance documents. The Hotline number is (202) 554-1404. The EPA Public Information Center can send you information on EPA regulations. You can reach the Center at (202) 382-2080 or (202) 475-7751.

The EPA has an Asbestos Ombudsman to provide information on the handling and abatement of asbestos in schools, the workplace and the home. Also, the EPA Asbestos Ombudsman can help citizens with asbestos-in-school complaints. The Ombudsman can be reached toll-free at (800) 368-5888, direct at (703) 557-1938 or 557-1939.

To obtain a current listing of accredited labs contact NIST NVLAP at (301)975-4016.

Glossary of Terms

AHERA	The Asbestos Hazard Emergency Response Act, passed by Congress in 1986
CAA	Clean Air Act
CERCLA	The Comprehensive Environmental Response Compensation and Liability Act. Also known as the "Superfund."
EPA	The United States Environmental Protection Agency
EHSD	Environmental Health and Safety Division, U.S. EPA
Friable Asbestos Material	Any material containing more than one percent asbestos, as determined using the method specified in Appendix A, subpart F 40 CFR part 763, section 1, Polarized Light Microscopy, that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent as determined by a method other than point counting by polarized light microscopy (PLM), verify the asbestos by point counting using PLM.
Glovebag	A sealed compartment with attached inner gloves used for the handling of asbestos-containing materials.
NARS	National Asbestos Registry System
NESHAP	The National Emission Standard for Hazardous Air Pollutants found in Title 40 CFR part 61 promulgated under Section 112 of the Clean Air Act.
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NVLAP	National Voluntary Laboratory Accreditation Program
OSHA	Occupational Safety & Health Administration
Particulate Asbestos Material	Finely divided particles of asbestos or material containing asbestos.
RACM	Regulated Asbestos-Containing Material. RACM means (a) Friable asbestos material, (b) Category I nonfriable ACM that has become friable, (c) Category I nonfriable

	ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by the Asbestos NESHAP.
RCRA	Resource Conservation and Recovery Act
TSCA	Toxic Substances Control Act
Visible Emissions	Any emissions, which are visually detectable without the aid of instruments, coming from RACM or asbestos-containing waste material, or from any asbestos milling, manufacturing, or fabricating operation.

Chapter 14: EPA O&M Guidance Document

EPA O&M GUIDANCE DOCUMENT

Sections:

Managing Asbestos in Place:
A Building Owner's Guide to Operations and Maintenance
Programs for Asbestos-Containing Materials

United States
Environmental Protection
Agency

Pesticides and Toxic Substances
(TS-799)

20T-2003
July 1990

EPA

Managing Asbestos In Place

A Building Owner's Guide to Operations and Maintenance Programs for Asbestos-Containing Materials



Printed on Recycled Paper

Contents

ACKNOWLEDGEMENTS v

FOREWORD vii

1. WHY IS ASBESTOS A PROBLEM?

Introduction and Overview 1
- Background 2
- Chapter Summary 4

2. WHAT IS AN O&M PROGRAM?

Purpose and Scope of an Operations and Maintenance program 5
- Purpose of O&M Program 5
- Scope of an O&M Program 5
- Chapter Summary 6

3. HOW DOES THE PROGRAM START?

Laying the Foundation for an Effective O&M Program 7
- The Asbestos Program Manager 7
- BuildingInspectionandAssessment 7
- Developing an O&M Program 8
- IrnplementingandManaging an O&M Program 8
- Cost Considerations 9
- Selectingandhnplementing Alternative Abatement Actions 9
- Chapter Summary. 11

4. WHAT DOES AN O&M PROGRAM INCLUDE?

O&M Program Elements 12
- Informing Building Workers, Tenants, and Other Occupants 12
- ACMSurveiUance-Reirwectionand Periodic Surveillance 14
- Supplement to Visual/Physical Evaluation 14
- WorkControl/Permit System 15
- O&M Work Practices 16
  - –Worker protection programs 17
  - –Basic O&M Procedures. 18
  - –O&M Cleaning Practices 19
  - –Procedures for Asbestos Fiber Release Episodes 20
- Recordkeeping 22
- Chapter Summary 22

5. WHAT O&M TRAINING IS NECESSARY?

Types of Training 23
- Chapter Summary 25

6. WHAT REGULATIONS AFFECT ASBESTOS MANAGEMENT PROGRAMS IN BUILDINGS, ESPECIALLY O&M PROGRAMS?

Federal, State, and Local Regulations Affecting O&M Programs. 26
- OSHA Regulations &EPA Worker Protection Rule 26
  - –Small-scale, Short-duration Projects 27
- EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) Regulations. . . .27
  - –Notification 28
  - –Emissions Control and Waste Disposal 28
- Resource Conservation and Recovery Act (RCRA); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or "Superfund") 28
- Asbestos Hazard Emergency Response Act (AHERA) 28
- Asbestos Ban and Phaseout Rule 28
- Chapter Summary 29

APPENDIX A.

Glossary 30

APPENDIX B.

Sample Recordkeeping Forms 31

APPENDIX C.

Illustrative Organzation Charts 35

APPENDIX D.

Additional Assistance (EPA, NESW, OSHA; Training) 37

APPENDIX E.

Respiratory Protection Recommendations 38

APPENDIX F.

Existing EPA Guidance For ACM Control 39

APPENDIX G.

Sample List: Suspect Asbestos-Containing Materials 40

APPENDIX H.

References 40

DISCLAIMER

This document was prepared under contract to an agency of the United States Government. Neither the United States Government nor any of their employees makes any warranty, expressed or implied, or assume any legal liability for any third party's use of or the results of such use of any information, product, or process discussed in this document. Mention or illustration of company or trade names, or of commercial products does not constitute endorsement by the U.S. Environmental Protection Agency.

Acknowledgements

The time and effort that many individual contributed to the development of this document is gratefully acknowledged by the U.S. Environmental Protection Agency (EPA). The material in this publication represents EPA's approximately 11 years of experience in considering public input and fine tuning policies on managing asbestos-containing materials in buildings. This document incorporates views expressed by safety and health professionals, property owners and managers, public officials, general industry representatives, workers, and the general public.

The primary EPA developer and coordinator of the final document was Dr. Robert Jordan of the Technical Assistance Section, Environmental Assistance Division, Office of Toxic Substances. Without Bob's constant oversight, combined with his technical knowledge and concern that the document be representative of state-of-the-art asbestos management, this document would not have reached the public.

Joe Schechter, Chief of the Technical Assistance Section, managed the project and helped clarify and edit the Guide. Bob McNally Chief of the Assistance Programs Development Branch, was instrumental in the formative period of the Guide's development and also devoted long hours to its review Other important contributions within the Environmental Assistance Division came from Tom Tom and Dave Kling. Sylvia Thomas provided necessary assistance in revisions of the early drafts. Esther Tepper and Jane Gurin helped review the Guide in its final revisions, to make sure the document was written in easy-to-understand language.

The original work which provided the foundation for the project was performed under a contract with Battelle Memorial Institute (No. 68-02-4294) by Dr. Dale Keyes and Dr. Jean Chesson, under the direction of Edie Sterrett and Cindy Stroup of the EPA Exposure Evaluation Division. They prepared the first drafts of the document and were instrumental in establishing its final format.

EPA staff also gratefully acknowledge the work of staff from the Georgia Tech Research Institute (GTRI). Through a cooperative agreement with EPA they served as the overall project coordinator and provided thoughtful technical guidance throughout this entire process. The GTRI team also developed several key sections of the Guide.

This publication was refined through a peer review meeting held in October 1988 in Washington, DC, and by a series of comment periods provided through May 1990. The following individuals gave their time and provided comments:

John Biechman, *Safe Buildings Alliance*
Wolfgang Brandner, *U.S. EPA Region VII*
Frank Bull, *Bull, Brown & Kilgo Architects*
Eva Clay *The Environmental Institute*
William Cobbs, *U.S. General Services Administration*
Mark Demyanek, *Georgia Tech Research Institute*
Michael Duffy, *Service Employees International Union*
Paul Fidducia, *Winston and Strawn*
Eugene Fisher, *Association of Wall and Ceiling Industries*
Douglas Greenaway *Consultant (formerly, Building Owners and Managers Association International)*
David Harris, *National Institute of Building Sciences*
Steve Hays, *Gobbell Hays Partners*
Joseph Hopkins, *U.S. Department of Energy*
David Mayer, *Georgia Tech Research Institute*
Richard Mendes, *New York City Department of Environmental Protection*
Michael Miles, *Tishman Spyer Properties*
Roger Morse, *ENTEK Environmental and Technical Services, Inc.*
Robert Navratil, *RREEF Funds, Construction and Engineering*
Anthony Restaino, *U.S. EPA Region V*
Richard Roth, *Social Security Administration*
Sims Roy, *U.S. EPA, Office of Air Quality Planning and Standards*

Scott Schneider, *Workers' Institute for Occupational Safety and Health*
Henry Singer, *U.S. General Services Administration*
Thomas Warren, *Rose Associates, Inc.*

In addition to these individuals, the EPA acknowledges the contribution of the Policy Dialogue Group on Asbestos in Public and Commercial Buildings, which met several times during 1989–1990. The purpose of *this* multidisciplinary group was to identify the problems associated with asbestos in public and commercial buildings and to develop policy recommendations for solving these problems. Many comments raised by the Dialogue Group in the area of asbestos management were incorporated into this document.

Foreword

In February 1988, the Administrator of the Environmental Protection Agency (EPA) recommended to Congress that the Agency work during the next three years to enhance the nation's technical capability in asbestos by helping building owners better select and apply appropriate asbestos control and abatement actions in their buildings. The publication of this guidance document is EPA's most extensive effort to date to carry out that recommendation. In fact, *Managing Asbestos In Place* is the most comprehensive asbestos guide published by EPA since the Agency expanded and updated *Guidance for Controlling Asbetos-Containing Materials in Buildings (also known as the* Purple Book) in June 1985. Based on the insights and recommendations of nationally recognized asbestos experts, this new guide, along with a new operations and maintenance work practices manual expected to be available in 1991, provides "state-of-the-art" instruction to building owners to help them successfully manage asbestos-containing materials in place.

Managing Asbestos in Place does not supplant the 1985 Purple Book as EPA's principal asbestos guidance document. Rather, based on our experience since 1985, it expands and refines the Purple Book's guidance for a special operations and maintenance (O&M) program. In particular, the guide more strongly emphasizes the importance of in-place management. The guide's purpose is two-fold. First, it offers building owners the more detailed and up-to-date instruction they need to carry out a successful O&M program. Second, it informs building owners, lenders, and insurers that a properly conducted O&M program can in many cases be as appropriate an asbestos control strategy as removal. Furthermore, in some cases, an O&M program is more appropriate than other asbestos control strategies, including removal.

Emphasizing the importance and effectiveness of a good O&M program is a critical element of EPA's broader effort to put the potential hazard and risk of asbestos exposure in proper perspective. That effort centers around communicating the following jive *facts,* which EPA hopes will help calm the unwarranted fears that a number of people seem to have about the mere presence of asbestos in their buildings and discourage the spontaneous decisions by some building owners to remove all asbestos-containing material regardless of its condition.

FACT ONE: Although asbestos is hazardous, the risk of asbestos-related disease depends upon exposure to airborne asbestos fibers.

In other words, an individual must breathe asbestos fibers in order to incur any chance of developing an asbestos-related disease. How many fibers a person must breathe to develop disease is uncertain. However, at very low exposure levels, the risk maybe negligible or zero.

FACT TWO: Based upon available data, the average airborne asbestos levels in buildings seem to be very low. Accordingly, the health risk to most building occupants also appears to be very low.

A 1987 EPA study found asbestos air levels in a small segment of Federal buildings to be essentially the same as levels outside these buildings. Based on that limited data, most building occupants (i.e., those unlikely to disturb asbestos-containing building materials) appear to face only a very slight risk, if any, of developing an asbestos-related disease.

FACT THREE: Removal is often not a building owner's best course of action to reduce asbestos exposure. In fact, an improper removal can create a dangerous situation where none previously existed.

By their nature, asbestos removals tend to elevate the airborne level of asbestos fibers. Unless all safeguards are properly applied, a removal operation can actually increase rather than decrease the risk of asbestos-related disease.

FACT FOUR: EPA *only* requires asbestos removal in order to prevent significant public exposure to airborne asbestos fibers during building demolition or renovation activities.

Asbestos removal before the wrecking ball swings into action is appropriate to protect public health. At other times, EPA believes that asbestos removal projects, unless well-designed and properly performed, can actually increase health risk.

FACT FIVE: EPA *does* recommend a pro-active, in-place management program whenever asbestos-containing material is discovered.

As this guide will explain in some detail, in-place management does *not* mean "do nothing." It means having a program to ensure that the day-to-day management of the building is carried out in a manner that minimizes release of asbestos fibers into the air, and ensures that when asbestos fibers are released, either accidentally or intentionally proper control and cleanup procedures are implemented. As such, it may be all that is necessary to control the release of asbestos fibers, until the asbestos-containing material in a building is scheduled to be disturbed by renovation or demolition activities.



Why Is Asbestos a Problem?

Introduction: Asbestos in Buildings

This U.S. Environmental Protection Agency (EPA) guide is primarily directed to owners and managers of office buildings, shopping centers, apartment buildings, hospitals, and similar facilities which may contain asbestos materials. Managers of industrial plants and other types of structures may need to supplement this information with additional specialized guidance. This document gives building owners, managers, workers, and other key building staff basic information on how to develop and carry out high-quality operations and maintenance programs for managing asbestos in place to safeguard the health of all building occupants. An operations and maintenance (O&M) program can be defined as a formulated plan of training, cleaning, work practices, and surveillance to maintain asbestos-containing materials (ACM) in good condition.

In this document you will find the following information:

- The objectives of an O&M program, and an indication of the scope of O&M activities (Chapter 2);
- Basic steps to take before starting an O&M program, including an initial survey and evaluation of ACM (Chapter 3);
- How to implement and manage the program, including some basic cost considerations (Chapter 3);
- O&M work practices that protect both workers and the general building environment (Chapter 4);
- Recordkeeping suggestions and requirements (a section of Chapter 4);
- Training recommendations and requirements for workers performing O&M activities (Chapter 5); and
- An overview of federal regulations, including those affecting O&M programs (Chapter 6).

In addition, the Appendices provide other useful information, including a glossary of useful terms, and contacts for additional assistance.

How O&M Fits In

There are steps which a building owner can take to prevent asbestos fiber releases or resuspension of already-released fibers, or control fiber releases quickly and safely if they occur. O&M programs are designed to achieve both these goals. This guide's purpose, therefore, is to inform building owners about how to develop, implement and manage effective O&M programs, and to encourage their use.

EPA recommends a pro-active, in-place management program whenever asbestos is discovered. In many buildings, a well-run O&M program may be all that is necessary to control the release of asbestos fibers until the ACM in the building is abated through renovation or demolition activities. Also, an emergency repair to equipment or building services, or an unexpected incident such as ACM falling from a surface could necessitate a different control strategy However, barring such events, if ACM is properly managed, release of asbestos fibers into the air is minimized. The exposure to asbestos fibers, and therefore the risk of asbestos-related disease, can be reduced to a negligible level for all building occupants.

An O&M program may also provide an effective, less costly alternative to wholesale removal operations. Some additional cost-related considerations are discussed in Chapter 3.

The EPA National Emission Standards for Hazardous

An O&M program can be defined as a formulated plan of training, cleaning, work practices, and surveillance to maintain asbestos-containing materials in good condition.

Air Pollutants (NESHAP) regulations on asbestos may require ACM removal prior to renovation and/or demolition projects, to prevent significant asbestos releases into the air (see Chapter 6). Additionally removal of some ACM in a building will be necessary if the material has been damaged beyond repair. *However*, at other times, removal is often *not* a building owner's best course of action to reduce asbestos exposure. (Extraneous factors –for example, difficulty in obtaining insurance, or obtaining financing relative to a real estate transaction-may actually represent the driving forces in a decision to remove all ACM, rather than a health-based need for removal.) In fact, unless all safeguards are properly applied by trained, experienced individuals, removing ACM can actually increase building occupants' risk of asbestos-related disease.

Background

The Asbestos Issue

Asbestos fibers can cause serious health problems. If inhaled. they can cause diseases which disrupt the normal functioning of the lungs. Three specific diseases–asbestosis (a fibrous scarring of the lungs), lung cancer, and mesothelioma (a cancer of the lining of the chest or abdominal Cavity) -have been linked to asbestos exposure. These diseases do not develop immediately after inhalation of asbestos fibers; it may be 20 years or more before symptoms appear.

In general, as with cigarette smoking and the inhalation of tobacco smoke, the more asbestos fibers a person inhales, the greater the risk of developing an asbestos-related disease. Most of the cases of severe health problems resulting from asbestos exposure have been experienced by workers who held jobs in industries such as shipbuilding, mining, milling, and fabricating, where they were exposed to very high levels of asbestos in the air, without benefit of the worker protections now afforded by law Many of these same workers were also smokers. These employees worked directly with asbestos materials on a regular basis and, generally for long periods of time as part of their jobs. Additionally there is an increasing concern for the health and safety of construction, renovation, and building maintenance personnel, because of possible periodic exposure to elevated levels of asbestos fibers while performing their jobs.

Whenever we discuss the risk posed by asbestos, we must keep in mind that asbestos fibers can be found nearly everywhere in our environment (usually at very low levels). There is, at this time, insufficient information concerning health effects resulting from low-level asbestos exposure, either from exposures in buildings or from our environment. This makes it difficult to accurately assess the magnitude of cancer risk for building occupants, tenants, and building maintenance and custodial workers. Although in general the risk is likely to be negligible for occupants, health concerns remain, particularly for the building's custodial and maintenance workers. Their jobs are likely to bring them into close proximity to ACM, and may sometimes require them to disturb the ACM in the performance of maintenance activities. For these workers in particular, a complete and effective O&M program can greatly reduce asbestos exposure. This kind of O&M program can also minimize asbestos exposures for other building occupants as well.

What is Asbestos?

The term "asbestos" describes six naturally occurring fibrous minerals found in certain types of rock formations. Of that general group, the minerals chrysotile, amosite, and crocidolite have been most commonly used in building products. When mined and processed, asbestos is typically separated into very thin fibers. When these fibers are present in the air, they are normally invisible to the naked eye. Asbestos fibers are commonly mixed during processing with a material which binds them together so that they can be used in many different products. Because these fibers are so small and light, they may remain in the air for many hours if they are released from ACM in a building. When fibers are released into the air they may be inhaled by people in the building.

Asbestos became a popular commercial product because it is strong, won't burn, resists corrosion, and insulates well. In the United States, its commercial use began in the early 1900's and peaked in the period from World War II into the 1970's. Under the Clean Air Act of 1970 the EPA has been regulating many asbestos-containing materials which, by EPA definition, are materials with more than 1 percent asbestos. The Occupational Safety and Health Administration's (OSHA) asbestos construction standard in section K, "Communication of hazards to employees," specifies labeling many materials containing 0.1% or more asbestos. In the mid-1970's several major kinds of asbestos materials, such as spray-applied insulation, fireproofing, and acoustical surfacing material, were banned by EPA because of growing concern about health effects, particularly cancer, associated with exposures to such materials.

In July 1989, EPA promulgated the Asbestos Ban and Phasedown Rule. The rule applies to new product manufacture, importation, and processing, and essentially bans almost all asbestos-containing products in the United States by 1997. This rule does *not* require removal of ACM currently in place in buildings.

Where is Asbestos Likely to be Found in Buildings?

In February 1988, the EPA released a report titled *EPA Study of Asbestos-Containing Materials in Public Buildings: A Report to Congress.* EPA found that "friable" (easily crumbled) ACM can be

found in an estimated 700,000 public and commercial buildings. About 500,000 of those buildings are believed to contain at least some damaged asbestos, and some areas of significantly damaged ACM can be found in over half of them.

According to the EPA study significantly damaged ACM is found primarily in building areas not generally accessible to the public, such as boiler and machinery rooms, where asbestos exposures generally would be limited to service and maintenance workers. Friable ACM, if present in air plenums, can lead to distribution of the material throughout the building, thereby possibly exposing building occupants. ACM can also be found in other building locations.

Asbestos in buildings has been commonly used for thermal insulation, fireproofing, and in various building materials, such as floor coverings and ceiling tile, cement pipe and sheeting, granular and corrugated paper pipe wrap, and acoustical and decorative treatment for ceilings and walls. Typically it is found in pipe and boiler insulation and in spray-applied uses such as fireproofing or sound-deadening applications.

The amount of asbestos in these products varies widely (from approximately 1 percent to nearly 100 percent). The precise amount of asbestos in a product cannot always be accurately determined from labels or by asking the manufacturer. Nor can positive identification of asbestos be ascertained merely by visual examination. Instead, a qualified laboratory must analyze representative samples of the suspect material. Appendix G contains a sample list of some suspect materials.

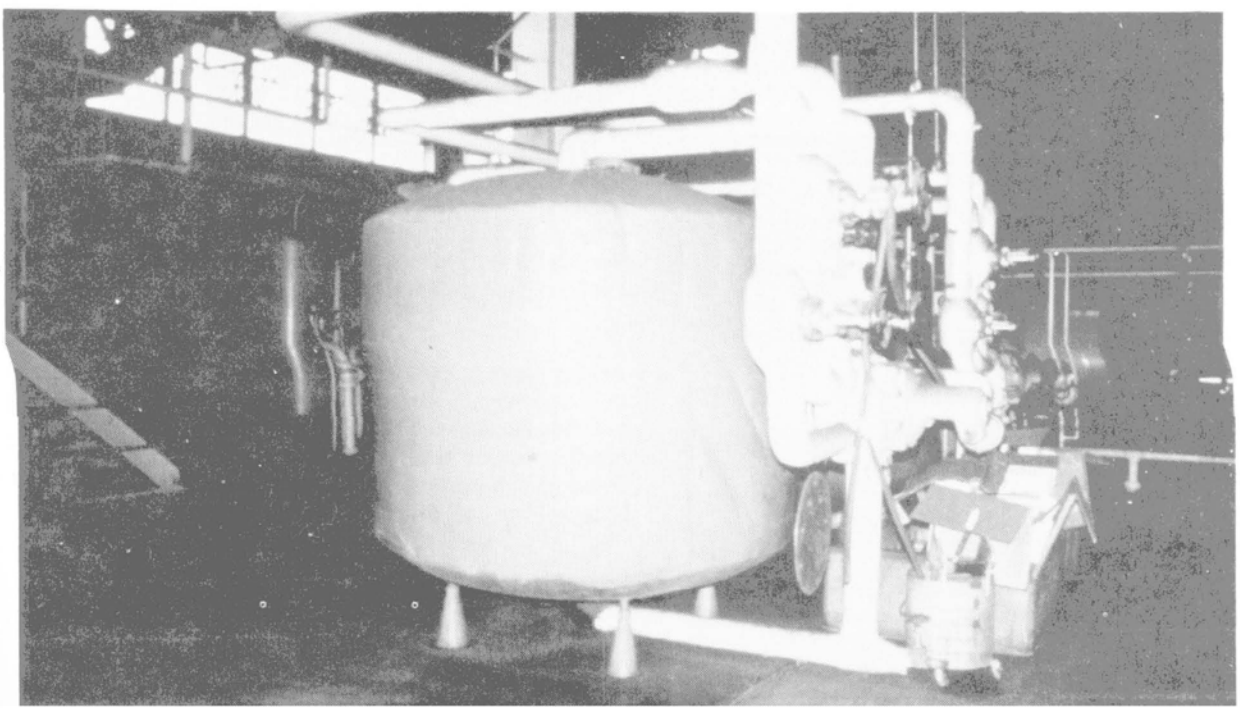


ACM which is in poor physical condition. Under a proper operations and maintenance program, corrective action would normally prevent deterioration of the insulation.

When is Asbestos a Problem?

Intact and undisturbed asbestos materials do not Dose a health risk. The mere presence of asbestos in-a building does not mean that the health of building occupants is endangered. ACM which is in good condition, and is not somehow damaged or disturbed, is not likely to release asbestos fibers into the air. When ACM is properly managed, release of asbestos fibers into the air is prevented or minimized, and the risk of asbestos-related disease can be reduced to a negligible level.

However, asbestos materials can become hazardous when, due to damage, disturbance, or deterioration over time, they release fibers into building air. Under these conditions, when ACM *is* damaged or disturbed– for example, by maintenance repairs conducted without proper controls — elevated airborne asbestos concentrations can create a potential hazard for workers and other building occupants.



ACM with sound structural integrity on the exterior of a domestic hot water tank. Note that the insulation jacketing is intact and there is no evidence of disturbance.

Chapter Summary

This document, directed to owners and managers of office buildings and similar facilities, should help lay the ground work for developing and implementing effective operations and maintenance programs. Major highlights in this section have focused on background information concerning asbestos and have touched on the current asbestos-in-buildings situation. Important points to remember are the following:

- Inhalation of asbestos fibers has been shown to cause asbestosis, lung cancer and mesothelioma. Much of our knowledge of these health effects has come primarily from studies of workers exposed routinely to very high levels of asbestos in their jobs,
- Information health effects of low-level asbestos exposure is less certain; custodial/ maintenance workers who sometimes disturb asbestos as part of their job would benefit from properly executed O&M programs.
- Three of the six naturally occurring asbestos minerals, chrysotile, amosite, and crocidolite, have been most commonly used in building products.
- Asbestos became a popular commercial product because of its strength, heat resistance, corrosion resistance, and thermal insulation properties.
- Asbestos-containing materials (ACM) are regulated by EPA, OSHA, and the Consumer Product Safety Cornmission (CPSC), and individual state and local agencies.
- Friable ACM can be found in about 700,000 public and commercial buildings. Many areas where asbestos is found are not accessible to the general public.
- Some common uses of asbestos have included pipe/boiler insulation, spray-applied fireproofing, floor and ceiling tile. cement pipe/sheeting and paper pipe wrap.
- Positive identification of asbestos requires laboratory analysis; information on labels or visual examination only is not sufficient.
- Intact, undisturbed materials generally do not pose a health risk; they may become hazardous when damaged, disturbed, or deteriorated over time and release fibers into building air.



What Is an O&M Program?

Purpose and Scope of an Operations and Maintenance Program

Purpose of O&M

The principal objective of an O&M program is to minimize exposure of all building occupants to asbestos fibers. To accomplish this objective, an O&M program includes work practices to (1) maintain ACM in good condition, (2) ensure proper cleanup of asbestos fibers previously released, (3) prevent further release of asbestos fibers, and (4) monitor the condition of ACM.

Scope of an O&M Program

An effective O&M program should address all types of ACM present in a building. ACM that maybe managed as part of an O&M program in buildings can be classified in one of the following categories:

1. **Surfacing Material:** Examples include ACM sprayed or troweled onto surfaces, such as decorative plaster on ceilings or acoustical ACM on the underside of concrete slabs or decking, or fireproofing materials on structural members.

2. **Thermal System Insulation (TSI):** Examples include ACM applied to pipes, boilers, tanks, and ducts to prevent heat loss or gain, or condensation.

3. **Miscellaneous ACM:** Examples include asbestos-containing ceiling or floor tiles, textiles, and other components such as asbestos-cement panels, asbestos siding and roofing materials.

The O&M program, when developed and implemented in a particular facility should include specific direction on how to deal with each of these general categories of ACM. Specified O&M work practices and procedures should be employed by trained personnel during building cleaning, maintenance, renovation, and general operational activities that may involve surfacing, thermal, or miscellaneous ACM. Some elaboration of O&M work practices and procedures is found in Chapter 4.

The O&M program can be divided into three types of projects

- those which are unlikely to involve any direct contact with ACM;
- those which may cause accidental disturbance of ACM;
- those which involve relatively small disturbances of ACM.

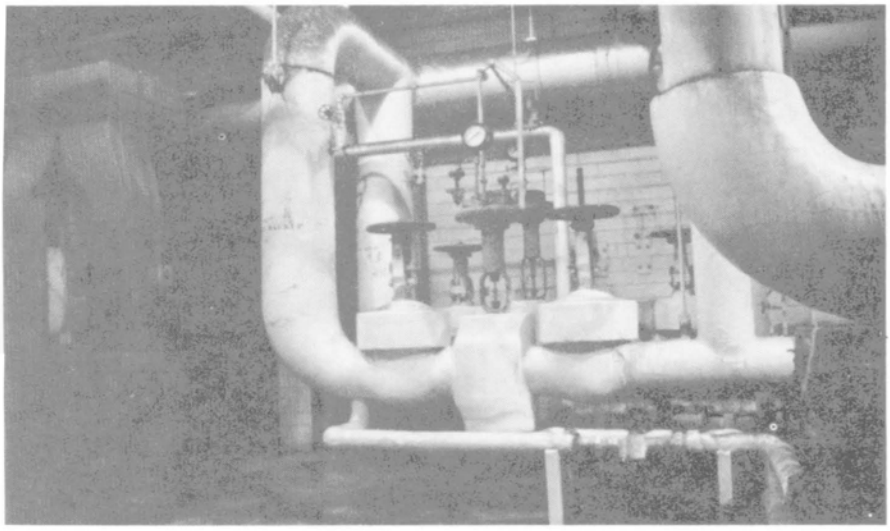
The first type may involve routine cleaning of shelves and counter tops or other surfaces in a building (provided ACM debris is not present). Generally such

An example of spray-applied surfacing ACM on a metal deck above a suspended ceiling.



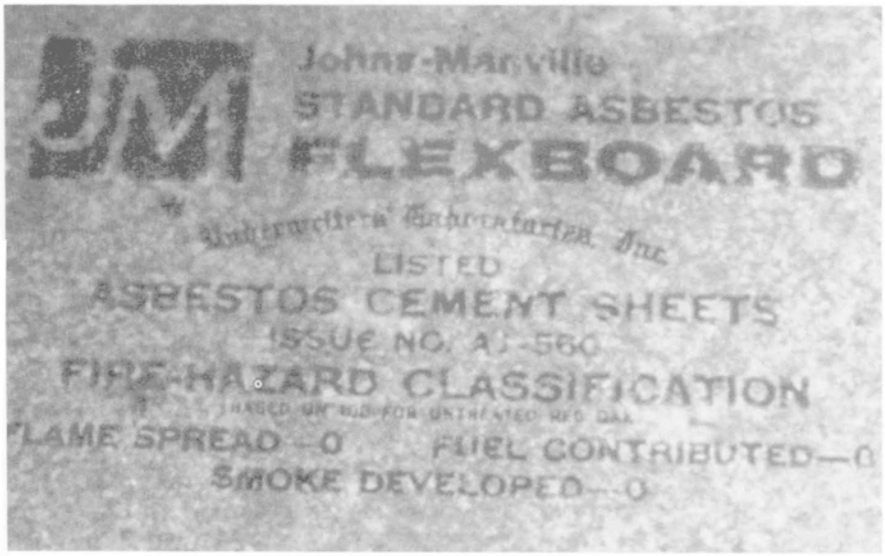
activities would not be expected to disturb ACM. The second type of project could include maintenance work above a suspended ceiling in an area that may have surfacing ACM overhead. The third type of project—small-scale, shor-duration maintenance, repair, or installation projects involving minor disturbances of ACM – includes activities such as installation of new light fixtures on or in an ACM ceiling. A single glovebag operation to remove a small amount of ACM to repair a pipe in a boiler room is another example of intentional small-scale, short-duration disturbance.

An example of asbestos-containing thermal system insulation on pipes in a building's mechanical room.



Larger projects involving more complex procedures for the intentional removal of ACM are considered asbestos abatement projects. These require asbestos control and abatement procedures that are outside the scope of an O&M program. Before taking action, building owners should consult qualified professionals for advice and alternative solutions. Guidance for building owners on the management of abatement projects is included in EPA's "Guidance for Controlling Asbestos-Containing Materials in Buildings" June 1985, also known as the "Purple Book."

An example of an asbestos-containing cement sheet product (miscellaneous ACM).



Chapter-Summary

The purpose of an operations and Maintenance Program is to minimize exposure of all building occupants to asbestos fibers. Through supervised work practices, ACM can be managed in place. Important points to remember are:

ACM can be classified into three categories:

- Surfacing Material
- Thermal System Insulation (TSI)
- Miscellaneous Material

O&M Programs can be divided into three types of project%

- Unlikely to involve direct contact with ACM.
- Accidental disturbance of ACM.
- Small-scale, short-duration maintenance or repair activity which may involve intentional disturbance of ACM.

MANAGING ASBESTOS IN PLACE

3

How Does the Program Start?

Laying the Foundation for an Effective O&M Program

A comprehensive asbestos control program for a building should include these basic steps:

- Appoint an Asbestos Program Manager and develop an organizational policy
- Conduct a physical and visual inspection of the building and take bulk samples of suspect materials to determine if ACM is present, establish an ACM inventory and assess the ACM's condition and potential for disturbance.
- If ACM is located, develop an O&M program, based on the inspection and assessment data.
- Implement and manage the O&M program conscientiously
- Select and implement abatement actions other than O&M when necessary

This chapter provides information about each of these basic steps. In addition, see Appendix F for a chart of references outlining existing EPA guidance for each of these steps.

The Asbestos Program Manager

The position of Asbestos Program Manager (APM) is frequently held by the building engineer, superintendent, facilities manager, or safety and health director. In a small organization, the building owner may have this role. Regardless of who holds this position, EPA stresses the need for the Asbestos Program Manager to be properly qualified, through training and experience, and to be *actively involved* in all asbestos-control activities. EPA accreditation under the Asbestos Hazard Emergency Response Act (AHERA) or state certification as a Building Inspector/Management Planner would be typical of the requisite training.

If the person selected is not adequately prepared, he or she should receive the training necessary to develop and manage an asbestos control program prior to beginning the job. If for some reason this is not possible, the building owner should strongly consider hiring a properly trained, experienced, and credentialed outside consultant or firm to provide direction to the owner or the Asbestos Program Manager.

In general, the Asbestos Program Manager should have the authority to oversee all asbestos-related activities in the building, including inspections, O&M activities, and other abatement actions. The Asbestos Program Manager will either train building workers in O&M techniques or ensure that such worker training takes place. In addition, he or she should oversee the custodial and maintenance staffs, contractors, and outside service vendors with regard to all asbestos-related activities.

Building Inspection and Assessment

To determine whether an asbestos control and management program should be implemented, the owner should have an initial building inspection performed to locate and assess the condition of all ACM in the building.

To determine whether an asbestos control and management program should be implemented, the owner should have an initial building inspection performed to locate and assess the condition of all ACM in the building. A trained, experienced and qualified inspector, who is able to perform the sampling of suspect ACM for laboratory analysis, should conduct the inspection. If an inspection is not performed, then certain suspect materials should be assumed to contain asbestos, and treated accordingly (Refer to Appendix G for a sample list of suspect ACM.)

EPA guidance on how to take "bulk" samples of suspect ACM is contained in several publications (see Appendix H) and from EPA Regional Asbestos Coordinators (listed in Appendix D).

The building inspection by a qualified professional serves as the basis for establishing an effective overall plan for dealing with the asbestos in the building. The inspector should advise the owner and the Asbestos



A properly trained and protected building inspector collecting a bulk sample of suspected asbestos-containing thermal system insulation.

program Manager of inspection findings. Of course, the inspection may show that ACM is *not* present and that an asbestos-control program is not required.

If ACM *is* found, the material's characteristics, condition, quantity and location within the building, as well as building use, will affect how the building owner should deal with the ACM. For example, operations and maintenance procedures may be appropriate and sufficient in a particular building for ACM in good condition. But O&M procedures alone are not sufficient for ACM that the inspector determines is significantly damaged, and may not be sufficient for some types of ACM situated in highly accessible areas; in these instances, some form of full scale abatement — repair, encapsulation, enclosure, encasement, or removal – will be necessary Removal of the ACM may also be appropriate when performed in conjunction with major building renovations, or as part of long-term building management policies (such as staged removal in conjunction with renovation over the life of the building, as covered by the EPA NESHAP requirements for removal before demolition or renovation).

Developing an O&M Program

If ACM is found, the building owner should have an O&M program developed as soon as possible. Either the Asbestos Program Manager or a qualified consultant should develop the O&M program. The written O&M program should state clearly the O&M policies and procedures for that building, identify and describe the administrative line of authority for that building, and should clearly define the responsibilities of key participants, such as the Asbestos Program Manager and custodial and maintenance supervisors and staff. The written O&M program should be available and understood by all participants involved in the management and operations of the building.

In general, the O&M program developed for a particular building should include the O&M program elements discussed in the next chapter. However, the building owner should make sure that the O&M program developed is site-specific and tailored for the building. The O&M program should take into account use, function, and design characteristics of a particular building.

Implementing and Managing an W&M Program

A well-developed O&M program is ineffective unless the building owner is committed to implementing it properly The building owner should convey this commitment to key personnel involved in a building's management and operations — particularly the Asbestos program Manager and custodial and maintenance supervisors and staff. The O&M program's success is contingent upon key personnel understanding the O&M program and committing themselves to implementing it effectively

To the greatest extent possible, the building owner should incorporate the O&M program into the existing system for managing a building's operations. Each building owner, therefore, will determine the appropriate organizational structure on a case-by-case basis. Two possible arrangements are suggested in Figures 1 and 2 in Appendix C.

When managing an O&M program, the Asbestos Program Manager should oversee all asbestos-related activities. In instances where a building owner hires a contractor to perform custodial and maintenance work, the Asbestos Program Manager should ensure that the contractor is qualified to conduct work that may involve ACM. Before hiring a contractor, the Asbestos Program Manager should investigate to determine whether the contractor's staff is qualified, trained and equipped to deal with O&M asbestos activities. Thoroughly checking the references of a contractor is a good recommended practice.

The Asbestos Program Manager should also monitor the work performed in the building by other contractors, such as electricians and plumbers, who might inadvertently disturb ACM. Instituting a work permit system, as discussed in the next chapter, may prevent accidental disturbances of ACM. Under this system, a

contractor must receive a work permit from the Asbestos Program Manager before commencing work. At that time, the Asbestos Program Manager will inform the contractor whether the project could disturb ACM and provide any special instructions to make sure the work is done properly *Communication between the Asbestos Program Manager and tenants occupying the building is essential to prevent activities that might compromise the O&M program.*

In addition, the Asbestos Program Manager should routinely and frequently check the work being performed in the building by contractors and custodial and maintenance staff to see if their work is disturbing ACM. By maintaining close surveillance over these activities, the Asbestos Program Manager can help ensure that work which may disturb ACM is being done safely Tenants should be required (by legal agreement or understanding) to notify the building owner or the Asbestos Program Manager before conducting even small planned renovations. This would help prevent building tenants from unknowingly disturbing ACM. For both the work permit system and the renovation notification requirement, clear and effective communications to workers and tenants are crucial to the success of the O&M management program.

The Asbestos Program Manager should periodically review the written O&M plan to determine whether it should be updated. For example, if all ACM were removed from some areas of the building during a recent renovation, or if some ACM was damaged, the O&M program should be revised accordingly The O&M program should remain in effect as long as there is ACM present in the building.

Cost Considerations

The costs associated with implementing and managing an O&M program may vary significantly depending on the types-of ACM, building-specific factors, actual O&M procedures adopted, types of equipment used, and the useful life of the building. Owners may find it more cost-effective to continue a well-supervised and managed O&M program than to incur the costs of immediate, large-scale removal. In addition to the direct costs of removal, other costs related to ACM removal include moving building occupants, arranging alternative space for building occupants during the removal work, and restoring the building after the removal is completed.

Clearly many factors enter into the decision. Only by conducting a cost-effectiveness analysis of the long-term options (e.g., comparing (a) immediate removal with (b) phased removal plus O&M with (c) removal just before demolition plus lifetime O&M) will owners be truly able to determine which option is most cost-effective for their buildings. The prudent owner may need to consult one or more qualified consultants or firms for advice, if such expertise does not exist within the owner's organization,

Selecting and Implementing Alternative Abatement Actions

In some instances, due to the condition of ACM or upcoming building renovations, a building owner may decide to take other abatement actions to deal with ACM in the building. These response actions could include encapsulation (covering the ACM with a sealant to prevent fiber release), enclosure (placing an air-tight barrier around the ACM), encasement (covering the ACM with a hard-setting sealing material), repair, or removal of the ACM. Qualified, trained, and experienced contractors should be used for any of these actions. EPA's Purple Book discusses most of these alternatives in some detail. In general, repair, encapsulation, enclosure, and encasement, are intended to help prevent the release of asbestos fibers. As aspects of O&M, these techniques manage ACM in place. See Appendix F of this document for additional federal reference sources on asbestos response actions.

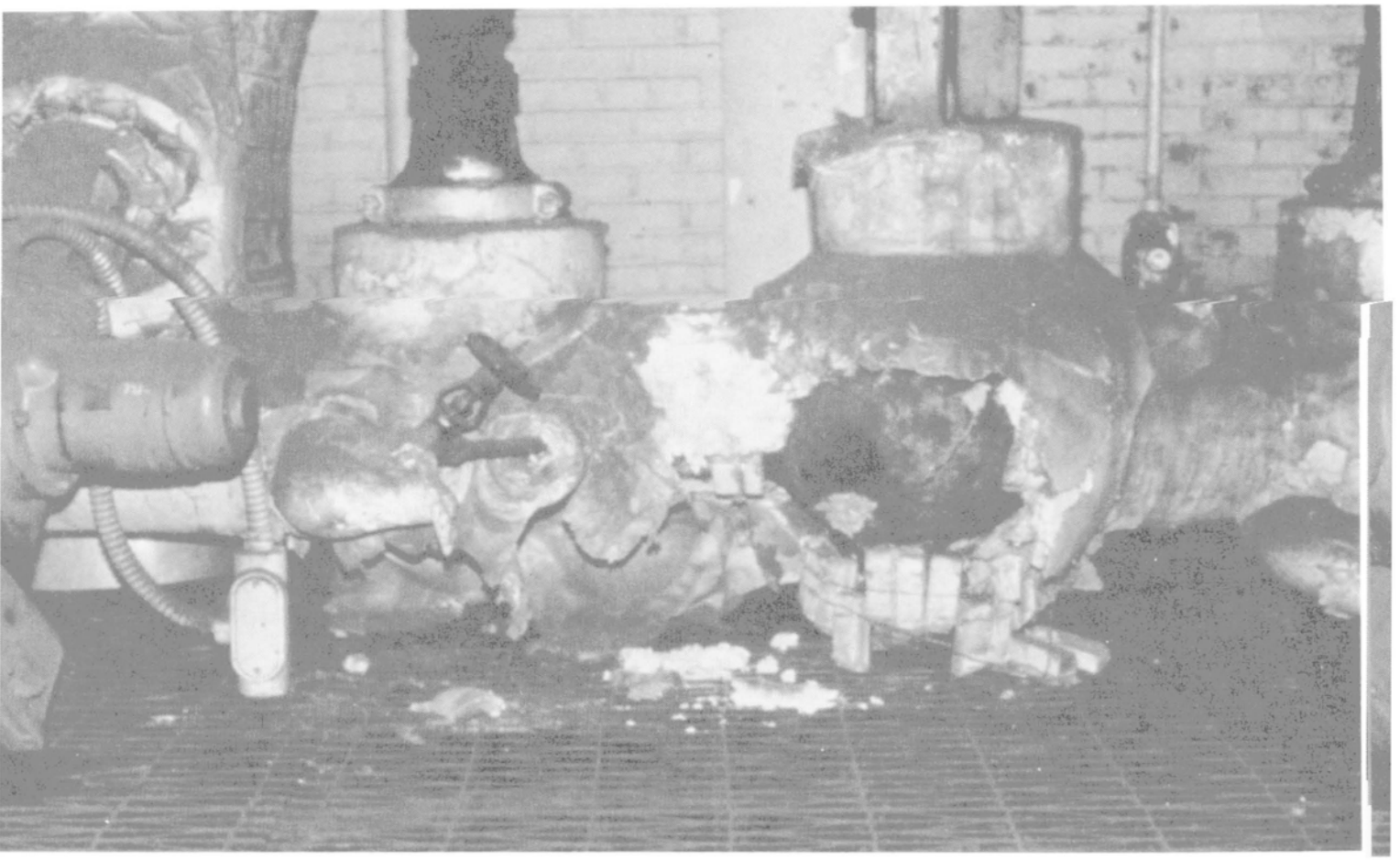
When determining which response alternative to select, the building owner and Asbestos Program Manager may consider seeking advice from qualified, independent consultants with specific training and experience in asbestos management.

Asbestos consultants should have a background in engineering, architecture, industrial hygiene, safety, or a similar field. Experts who are Registered and/or with Board Certified backgrounds are recommended. *To help ensure that no "conflict of interest" exists, consultants should not be affiliated with the abatement contractors who may be used on a recommended ACM control project, nor with analytical laboratories which perform sample analyses.* As with other similar business decisions, building owners should interview several consultants and check references.

Renovations (including remodeling or redecorating) of buildings or replacement of utility systems increase the potential for disturbing ACM.

Renovations (including remodeling or redecorating) of buildings or replacement of utility system increases the potential for disturbing ACM. Before conducting any renovation or remodeling work, the building owner should have the Asbestos Program Manager review asbestos inspection and assessment records to determine where ACM may be located, visually reinspect the area, and evaluate the likelihood that ACM will be disturbed. Any suspect or assumed ACM that could be disturbed during the renovation work should either be sampled and analyzed to determine whether it contains asbestos, or the work should be carried out as if the materials did contain asbestos. The Asbestos Program Manager should also ensure that no new ACM is introduced into the building as part of the renovation work.

Removal of the ACM before renovation begins maybe necessary in some instances. Removal is required by the Asbestos NESHAP regulations for projects which would break up more than a specified minimum amount of ACM; specifically at least 160 square feet of surfacing



Asbestos-containing thermal system insulation which has sustained significant damage in a mechanical/boiler room of a building.

or miscellaneous material or at least 260 linear feet of thermal system insulation (40 CFR 61.145-147). Building owners and managers are encouraged to contact their state or local health or environmental department for further clarification of these requirements (also, see Chapter 6 of this document). It is important to ensure that new materials placed in the building do not contain asbestos in order to comply with the recent EPA Asbestos Ban and Phase Out rule (see Chapter 6).

In general, building owners should thoroughly consider any decision to remove ACM. *O&M, encapsulation, encasement, enclosure, or repair may be viable alternatives to removal.* Building owners should assess these in-place management techniques carefully before deciding to remove undamaged ACM.

Under certain circumstances, however, such as when some ACM must be removed during building renovations, when the ACM has sustained a great deal of damage, or ACM disturbance will be difficult to manage properly the building owner may decide to remove ACM in parts of the building.

When removal must occur, only qualified, trained and experienced project designers and contractors should be permitted to design and perform the work. Building owners might consider contacting local, state, and federal asbestos regulatory agencies to see if prospective contractors have received citations for violating asbestos regulations in the past. In addition, if the building owner and Asbestos Program Manager are not properly qualified themselves, they should retain a qualified and independent project designer and a project monitor with training and experience in asbestos abatement to oversee and ensure that the asbestos abatement work is done safely. When these precautions are taken, asbestos removal is more likely to proceed safely and effectively

Proper completion of the ACM removal is best evaluated by means of the analytical procedures using transmission electron microscopy (TEM). (These are described in 40 CFR Part 763, Appendix A to Subpart E.) Clearance protocols for statistically comparing asbestos fiber levels inside the work area with outside levels are available. If the measured levels inside are not statistically higher than the average airborne asbestos concentration measured outside the abatement area, the cleanup is considered successful, and the space is judged ready for reoccupancy (For reference, see Appendix H, U.S. EPA “Guidelines for Conducting the AHERA TEM Clearance Test . . . .")

Chapter Summary

Laying the foundation for a comprehensive asbestos control program for a building includes some basic steps. Important points contained in this discussion are the following

An Asbestos Program Manager needs to be properly qualified through training and experience, and be actively involved in all asbestos control and disturbance activities.

An Asbestos program Manager should have authority to oversee and to direct custodial/ maintenance staff and contractors with regard to all asbestos-related activities.

An initial building inspection should be performed by a trained, qualified, experienced inspector to locate and assess the condition of all ACM in the building.

The inspection results serve as the basis for establishing an O&M program. O&M procedures may not be sufficient for certain ACM that is significantly damaged or in highly accessible areas.

An Asbestos Program Manager or qualified consultant should develop the written O&M program that is site-specific and tailored for individual buildings. The O&M program should take into account use, function and design characteristics of a building.

The success of any O&M program lies in the commitment by the building owner to implement it properly

When outside contractors are used for asbestos-related activities, their references and training should be thoroughly checked and their subsequent work monitored.

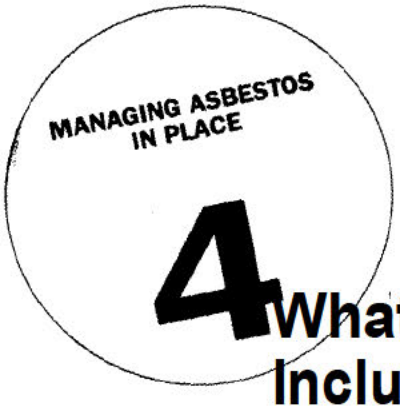
Periodically review written O&M programs.

Alternatives or control options that may be implemented under an O&M program include:

- repair
- encapsulation
- enclosure
- encasement
- removal (minor)

Removal of ACM before renovations may be necessary in some instances. (See NESHAP and State/Local regulations discussion in Chapter 6.)

The success of any O&M program depends on the building owner's commitment to implement it properly.



What Does an O&M Program Include?

O&M Program Elements

To achieve its objectives, an O&M program should include seven elements. Although these should appear in any O&M program, the extent of each will vary from program to program depending on the building type, the type of ACM present, and the ACM's location and physical condition. For example, if only nonfriable ACM is present, minimal notification might be needed, and custodial or maintenance staff would most likely have fewer work practices to be followed. If friable ACM is present, a more detailed O&M program should be prepared and followed. Each of the first six elements listed below is described in this chapter to provide an illustration of a basic O&M program. The seventh program element, training of the Asbestos Program Manager and custodial and maintenance staff, is very important. If staff are not adequately trained, the O&M program will not be effective. Chapter 5 is devoted exclusively to O&M training topics.

If staff are not adequately trained, the O&M program will not be effective.

A successful O&M program should include the following elements:

- **Notification:** A program to tell workers, tenants, and building occupants where ACM is located, and how and why to avoid disturbing the ACM. All persons affected should be properly informed.
- **Surveillance:** Regular ACM surveillance to note, assess, and document any changes in the ACM's condition.
- **Controls:** Work control/permit system to control activities which might disturb ACM.
- **Work Practices:** O&M work practices to avoid or minimize fiber release during activities affecting ACM.
- **Recordkeeping:** To document O&M activities.
- **Worker Protection:** Medical and respiratory protection programs, as applicable.
- **Training:** Asbestos Program Manager, and custodial and maintenance staff training.

Informing Building Workers, Tenants, and Other Occupants

Building owners should inform building workers, occupants, and tenants about the location and physical condition of the ACM that they might disturb, and stress the need to avoid disturbing the material. Occupants should be notified for two reasons: (1) building occupants should be informed of any potential hazard in their vicinity; and (2) informed persons are less likely to unknowingly disturb the material and cause fibers to be released into the air.

Building owners can inform occupants about the presence of ACM by distributing written notices, posting signs or labels in a central location where affected occupants can see them, and holding awareness or information sessions. The methods used may depend on the type and location of the ACM, and on the number of people affected. Some states and localities have "right-to-know" laws which may require that all occupants, workers, and visitors in buildings with ACM be informed that asbestos is present.

In service and maintenance areas (such as boiler rooms), signs such as "Caution — Asbestos — Do Not Disturb" placed directly adjacent to thermal system insulation ACM will alert and remind maintenance

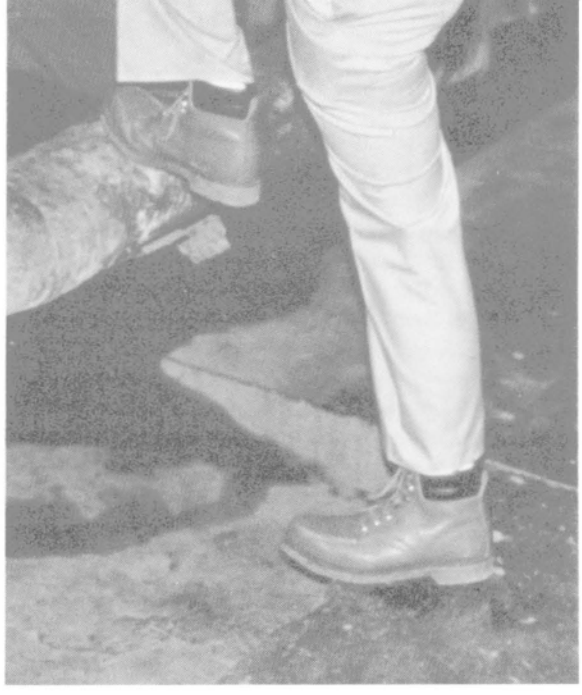
workers not to inadvertently disturb the ACM. In most cases, all boilers, pipes, and other equipment with ACM in service areas where damage may occur should have prominent warning signs placed next to the ACM. As an alternative, color coding can be used to identify the ACM in certain situations provided that all potentially involved parties understand the coding system.

Information sessions reinforce and clarify written notices and signs, and provide an opportunity to answer questions. All employees and tenants or tenant representatives likely to disturb ACM should be included in the notification program on a continuing basis. Building owners should inform new employees about the presence of ACM before they begin work. Owners should provide additional signs and information sessions in languages other than English where a significant number of workers, occupants, or visitors do not speak English. It maybe necessary to make special provisions for illiterate workers, such as providing clear verbal information or signs, about potential hazards of disturbing ACM. and showing them where ACM is located.

The specific information given to types of building occupants will vary For example, since service workers carry out certain tasks that office workers or tenants do not perform, they should receive additional information. Most important, O&M workers should receive the training necessary for them to perform their tasks safely

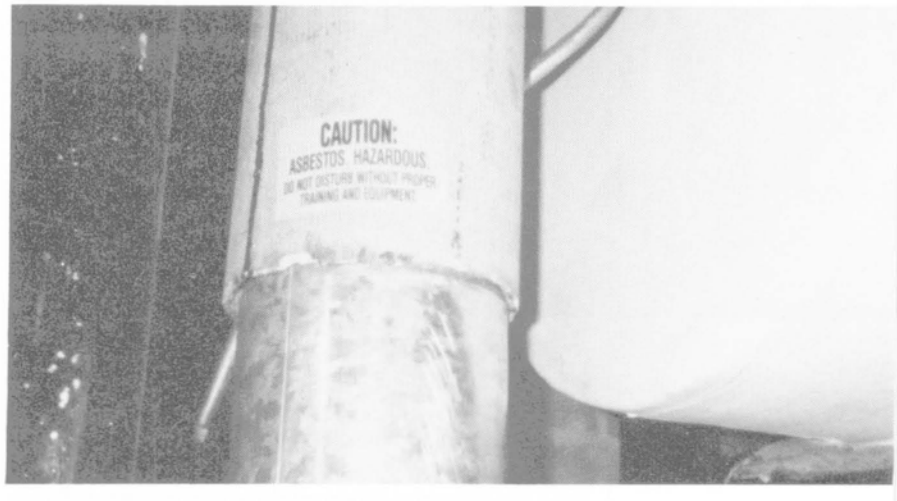
Whatever its form, the information given to building occupants and workers should contain the following points to the extent they reflect building conditions:

- ACM has been found in the building and is located in areas where the material could be disturbed.
- The condition of the ACM, and the response which is appropriate for that condition.
- Asbestos only presents a health hazard when fibers become airborne and are inhaled. The mere presence of ACM does not represent a health hazard.
- The ACM is found in the following locations (e.g., ceilings in Rooms 101 and G-323, walls in the lobby, above suspended ceilings in the first floor corridor, on columns in the main entry on pipes in the boiler room).
- Do not disturb the ACM (e.g., do not push furniture against the ACM, do not damage T S I) .
- Report any evidence of disturbance or damage of ACM to (name, location, and phone number of Asbestos Program Manager).



Routine maintenance activities can cause disturbance of ACM if workers are not properly trained in operations and maintenance procedures. Here, a worker carelessly contacts ACM, possibly damaging it.

- Report any dust or debris that might come from the ACM or suspect ACM, any change in the condition of the ACM, or any improper action (relative to ACM) of building personnel to (name, location, and phone number of Asbestos Program Manager).
- Cleaning and maintenance personnel are taking special precautions during their work to properly clean up any asbestos debris and to guard against disturbing ACM.
- All ACM is inspected periodically and additional measures will be taken if needed to protect the health of building occupants.



An example of an asbestos caution sign placed directly on a section of asbestos-containing duct insulation. Signs such as this help to ensure that workers will not inadvertently disturb ACM.

It is important to undertake an honest and open approach to the ACM notification procedure. Owners should strive to establish clear lines of communication with all building occupants regarding asbestos issues. People who are informed of the presence, location and condition of ACM in a building where they work or live, who understand that the mere presence of ACM is not necessarily hazardous to them, and who accept that ACM can often be managed effectively in place, can be

very helpful to the owner in eliminating or reducing hysteria on the part of other less informed building occupants. On the other hand, if occupants suspect the building owner is not being honest about asbestos activities in the building, that owner's credibility maybe questioned and the situation can become far more difficult to manage. *If and when asbestos incidents occur, it is especially important for the building owner to deal with occupants and contractors openly and honestly, for that is the best way to maintain occupant/ tenant confidence in both the owner and the building's asbestos program.*

ACM Surveillance

Visual reinspections of asbestos materials at regular intervals can detect changes in material condition. Here, surfacing ACM has delaminated from a ceiling in a building O&M routines can keep small problems from becoming big problems.

Reinspection and Periodic Surveillance

A visual reinspection of all ACM should be conducted at regular intervals as part of the O&M program. Combined with ongoing reports of changes in the condition of the ACM made by service workers, the reinspection should help ensure that any ACM damage or deterioration will be detected and corrective action taken.



According to recent EPA regulations covering schools (the Asbestos Hazard Emergency Response Act, "AHERA"), an accredited inspector must reinspect school buildings at least once every three years to reassess the condition of ACM. The AHERA regulations for schools also require a routine surveillance check of ACM every six months to monitor the ACM's condition. The AHERA Rule permits this surveillance to be conducted by a trained school custodian or maintenance worker. While these intervals are mentioned here as a guide, they may also be appropriate for other buildings. The Asbestos Program Manager should establish appropriate intervals, based on consultation with the building owner and any other qualified professionals involved in the O&M program.

EPA recommends a visual and physical evaluation of ACM during the reinspection to note the ACM's current condition and physical characteristics. Through this reinspection, it is possible to determine both the relative degree of damage and assess the likelihood of future fiber release. Maintenance of a set of visual records (photos or videotape) of the ACM overtime can be of great value during reinspection.

Some asbestos consultants recommend examining settled dust for accumulations of asbestos fibers as another surveillance tool in an O&M program. While no universally accepted standardized protocols currently exist for sampling and analysis of settled dust, positive results (i.e., ACM is present in the dust) may indicate the need for special cleaning of the affected area, or other action. Because the results of this testing are difficult to interpret and evaluate at this time, building owners should carefully consider the appropriateness of this testing to their situation.

Supplement to Visual/Physical Evacuation

As part of an O&M program, a carefully designed air monitoring program to detect airborne asbestos fibers in the building may provide useful supplemental information when conducted along with a comprehensive visual and physical ACM inspection and reinspection program. If the ACM is currently in good condition, increases in airborne asbestos fiber levels at some later time may provide an early warning of deterioration or disturbance of the material. In that way, supplemental air monitoring can be a useful management tool. If an owner chooses to use air monitoring in an "early warning" context, a knowledgeable and experienced individual should be consulted to design a proper sampling strategy Appendix H contains a reference to a useful guide to monitoring airborne asbestos, which can be consulted for further discussion of this subject.

If supplemental air monitoring is done, a baseline airborne asbestos fiber level should be established soon after the O&M program is initiated Representative, multiple air samples should be collected throughout the building during periods of normal building operation. This should be done over along enough period of time to be representative of existing conditions, in order to adequately characterize prevailing fiber levels in the building. *This air monitoring should supplement, not replace, physical and visual inspection.* Visual inspection can recognize situations and anticipate future exposure (e.g., worsening water damage), whereas air monitoring can only detect a problem after it has occurred, and fibers have been released.

Note that the collection of air samples for supplementary evaluation *should not* use aggressive air sampling methods. Aggressive sampling methods, in which air is deliberately disturbed or agitated by use of a leaf blower or fans, should be used at the completion of an asbestos removal project when the building or area is unoc-

cupied, not for routine monitoring.

The most accurate and preferred method of analysis of air samples collected under an O&M program would require the use of transmission electron microscopy (TEM). Phase contrast microscopy (PCM), which is commonly used for personal air sample analysis and as a screening tool for area air monitoring, cannot distinguish between asbestos fibers and other kinds of fibers which may be present in the air. PCM analysis also cannot detect thin asbestos fibers, and does not count short fibers. TEM analysis is approximately ten times more expensive than PCM analysis. However, the more accurate information on actual levels of airborne asbestos fibers should be more beneficial to the building owner who elects to use supplemental air monitoring in the asbestos management program. TEM analysis is most reliably performed by laboratories accredited by the National Institute for Standards and Technology (NIST; see Appendix D for telephone number), and who follow EPA's quality assurance guidelines. (Appendix H, U.S. EPA, Dec. 1989, "Transmission Electron Microscopy Asbestos Laboratories: Quality Assurance Guidelines.")

Selection of a reliable and experienced air monitoring firm and analytical laboratory is important, if the building owner elects to conduct supplemental air monitoring under the O&M program. A consultant knowledgeable in air sampling and analysis protocols can be contacted for recommendations if the building owner or Asbestos Program Manager has limited knowledge in this area.

Periodic air monitoring, conducted simultaneously with the visual reinspection or surveillance, would then be used to see if asbestos levels have changed relative to the baseline. Some building owners may wish to present current air monitoring results to building occupants in addition to information regarding the physical reinspections. Although this supplemental use of air monitoring as part of an O&M program may provide useful information, it is likely to be very expensive, particularly if the more accurate and recommended TEM analysis is used. Use of only a small number of measurements or measurements taken only at one time maybe misleading (i.e., overestimate or underestimate of fiber levels), and can lead to inappropriate decisions.

It should be noted that some of the exposures of persons to airborne asbestos fibers in buildings may result from episodic events, such as repair work or the accidental disturbance of the ACM or of ACM debris by maintenance activities inside the building. Air monitoring may not be done frequently enough to include such episodic events; this can lead to a misleading interpretation of air sampling results. In particular, air sampling may underestimate the exposure of O&M workers and building occupants. A good reference sourcebook for additional information on air sampling and analysis for asbestos fibers is "A Guide to Monitoring Airborne Asbestos in Buildings" (see Appendix H).

Work Control/Permit System

The O&M program should include a system to control all work that could disturb ACM. Some building owners have had success using a "work permit" program, which requires the person requesting the work to submit a Job Request Form to the Asbestos program Manager (Appendix B, Form 2) before any maintenance work is begun. The form gives the time and location of the requested work, the type of maintenance needed, and available information about any ACM in the vicinity of the requested work. The contractor or other person authorized to perform the work should be identified on the work request.



An example of a maintenance worker conducting activities near a friable asbestos-containing ceiling. Under a proper permitting system, the building Asbestos Program Manager would evaluate and authorize projects such as this prior to beginning work.

Upon receiving a pre-work Job Request Form, the Asbestos Program Manager should take the following steps:

1. Refer to written records, building plans and specifications, and any building ACM inspection reports to determine whether ACM is present in the area where work will occur. If ACM is present, but it is not anticipated that the material will be disturbed, the Asbestos Program Manager should note the presence of the ACM on the permit form and provide additional instruction on the importance of not disturbing the ACM.

2. If ACM is both present and likely to be disturbed, the Asbestos Program Manager or a designated supervisor qualified by training or experience, should visit the site and determine what work practices should be instituted to minimize the release of asbestos fibers during the maintenance activity

3. This determination should be recorded on the Maintenance Work Authorization Form (see example in Appendix B, Form 3), which *is* then sent to the in-house maintenance supervisor or to the maintenance contractor to authorize the work.

4. The Asbestos Program Manager should make sure that a copy of both the request and the authorization forms (if granted) are placed in the permanent file.

5. Where the task is not covered by previously approved standard work practices, the Asbestos Program Manager should make sure that the appropriate work practices and protective measures are used for the job.

6. For all jobs where contact with ACM is likely the Asbestos Program Manager or a designated supervisor qualified by training or experience should visit the work site when the work begins to see that the job is being performed properly For lengthy jobs where disturbance of ACM is intended or likely, periodic inspections should be made for the duration of the project.

7. The Asbestos Program Manager's observations should be provided on an *Evaluation of Work Form* (see Appendix B, Form 4). Any deviation from standard and approved work practices should be recorded immediately on this form and the practices should be immediately corrected *and reported to the Asbestos Program Manager*.

8. Upon completion of the work, a copy of the evaluation form should be placed in the permanent asbestos file for the building.

Building owners should consider using asbestos O&M work control forms similar to those which already may be in use for non-ACM work in their facilities, or expanding the existing forms to include the content of the request, approval, and evaluation forms illustrated in Appendix B.

It is important to undertake an honest and open approach in ACM notification.

The O&M management system should also address work conducted by outside contractors. Many building owners contract for at least some custodial and maintenance services. A building's asbestos work control/ permit system, as described above, should also cover contract work.

At a minimum, contracts with service trades or abatement companies should include the following provisions to ensure that the service or abatement workers can and will follow appropriate work practices:

- Proof that the contractor's workers have been properly notified about ACM in the owner's building and that they are properly trained and accredited (if necessary) to work with ACM.
- Copies of respiratory protection, medical surveillance, and worker training documentation as required by OSHA, EPA and/or state regulatory agencies.
- Notification to building tenants and visitors that abatement activity is underway (performed by owner).
- Written work practices must be submitted by the vendor or contractor for approval or modification by the Asbestos Program Manager. The vendor or contractor should then agree to abide by the work practices as finally accepted by the Asbestos Program Manager.
- Assurance that the contractor will use proper work area isolation techniques, proper equipment, and sound waste disposal practices.
- Historical air monitoring data for representative examples of the contractor's previous projects, with emphasis on projects similar to those likely to be encountered in the building.
- Provisions for inspections of the area by the owner's representative to ensure that the area is acceptable for re-entry of occupants/tenants.
- A resume for each abatement contractor/ supervisor or maintenance crew chief, known as the "competent person" in the OSHA standard and EPA Worker Protection Rule.
- Criteria to be used for determining successful completion of the work (i.e., visual inspections and air monitoring).
- Any other information deemed necessary by the owner's legal counsel.

  Notification to EPA (and other appropriate agencies) if the abatement project is large enough (see Chapter 6).

O&M Work Practices

- The O&M program focuses on a special set of work practices for the custodial, maintenance, and construction staff. The nature and extent of any special work practices should be tailored to the likelihood that the ACM will be disturbed and that fibers will be released. In general, four broad categories of O&M work practices are recognized

1. **Worker Protection Programs –** These work practices help ensure custodial and maintenance staff are adequately protected from asbestos exposure.

2. **Basic O&M Procedures –** Basic procedures are used to perform routine custodial and maintenance tasks that may involve ACM.

3. **Special O&M Cleaning Techniques –** Special techniques to cleanup asbestos fibers on a routine basis.

4 Procedures for Asbestos Fiber Release Episodes – If moderate to relatively large amounts of ACM are disturbed, the building owner should use these procedures to address the hazard.

A brief synopsis of worker protection and O&M work practices follows. *(Note: A more detailed, technically oriented O&M "work practices" manual specifically addressing topics such as work practices, worker protection, and specific information on how to carry out O&M plans, is being developed, with publication expected in 1991.)*

Worker Protection Programs

A worker protection program includes engineering controls, personal exposure monitoring, medical surveillance, and personal protection. While engineering controls are the preferred method of worker protection, there are few engineering control options available for O&M work. This section discusses two key aspects of personal protection: use of respiratory protection and protective clothing for workers in an asbestos O&M program. According to OSHA regulations (see Chapter 6), a written respiratory protection program is necessary whenever an O&M program specifies that service workers wear respirators, or where respirators are made available to employees. OSHA regulations also require a respirator program whenever workers are exposed, or are likely to be exposed, to fiber levels above OSHA'S "permissible exposure limits" such as the 8-hour time weighted average (TWA) limit or the 30-minute "excursion limit" (EL). The 8-hour TWA limit and the EL are described in more detail in Chapter 6. In addition, OSHA requires workers to wear special protective clothing under the same circumstances.

Respiratory Protection/Worker Protection Programs The selection of approved respirators, suitable for the hazards to which the worker is exposed, is only one aspect of a complete respiratory protection program. Other elements include written operating procedures for respirator use; outlining personnel responsibilities for respirator cleaning, storage, and repair; medical examination of workers for respirator use; training in proper respirator use and limitations; respirator fit testing respirator cleaning and care; and work-site supervision. All of these are described in detail in the OSHA respirator standard, 29 CFR 1910.134. The O&M respirator program can be administered by the facility safety and health manager or the Asbestos Program Manager, if properly qualified.

Proper respiratory protection is an integral part of all custodial and maintenance activities involving potential exposure to asbestos. When in doubt about exposure during a certain work operation, building owners should provide respiratory protection to custodial and maintenance workers. OSHA specifies general types of respirators for protection against airborne asbestos during "construction" activities, which include abatement, renovation, maintenance, repair, and remodeling.

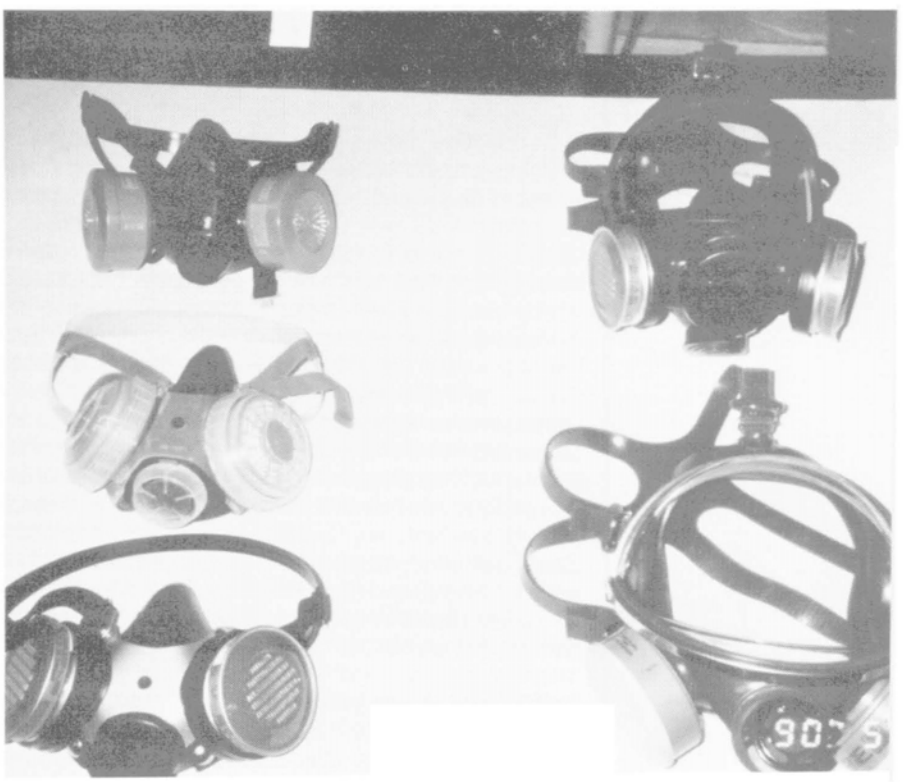
Personal air sampling is not the same as area air monitoring. Personal air sampling (required by OSHA) is designed to measure an individual worker's exposure to fibers while the worker is conducting tasks that may disturb ACM. The sampling device is worn by the worker and positioned so that it samples air in the worker's breathing zone. In contrast, area (or ambient) air sampling is conducted to get an estimate of the numbers of airborne asbestos fibers present in a building. It is used as an assessment tool in evaluating the potential hazard posed by asbestos to all building occupants. (See the previous discussion of area air monitoring on page 14.)

When adequate care is taken to prevent or minimize and control fiber release, routine, small-scale/short-duration maintenance or custodial tasks are not likely to generate high levels of airborne asbestos compared to large asbestos removal projects; and respirators which filter breathing air may be used. **OSHA, EPA, and NIOSH are on record as *not* recommending single use, disposable paper dust masks for use against asbestos; in fact, OSHA has *disallowed their use* against airborne asbestos fibers.**

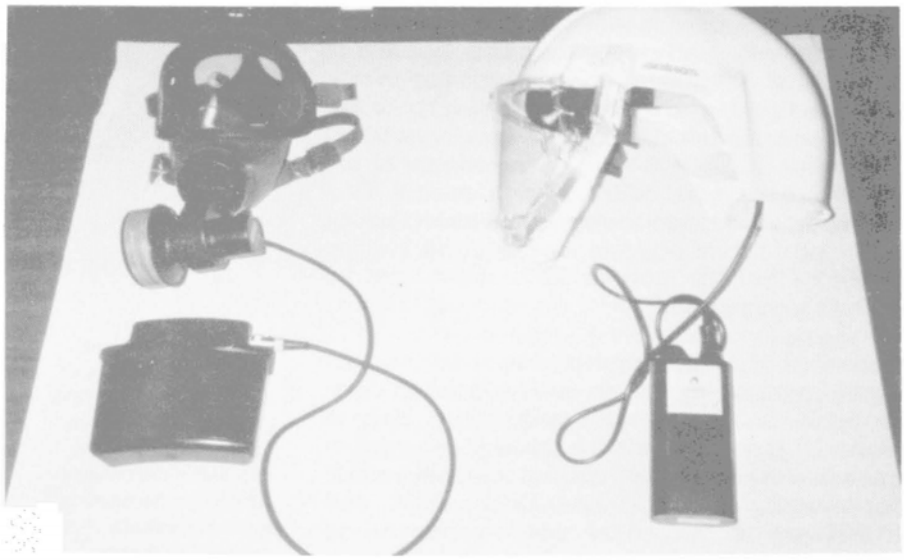
The options that may be used include:

- A half-face or full facepiece, negative pressure, air-purifying respirator with replaceable high-efficiency filters.

Pictured below are different examples of air-purifying, negative pressure respirators equipped with high-efficiency cartridges which can be used to protect workers against asbestos exposure. On the left are examples of half-mask facepieces equipped with high-efficiency cartridges, and on the right are examples of full facepiece, high-efficiency masks.



- A half or full facepiece powered air-purifying respirator (PAPR) with replaceable high-efficiency filters. This has a battery powered pump which assists breathing and provides positive pressure in the facepiece.



Pictured above are two different types of powered air-purifying respirators (PAPR's) equipped with high-efficiency filters. On the left is an example of a tight fitting, full facepiece PAPR, and on the right is an example of a loose-fitting helmet style PAPR.

Under the OSHA standards for asbestos, any employee required to wear a negative pressure respirator can request a powered air-purifying respirator, and the employer is required to provide a fully functional and approved unit, provided it will afford the worker at least equal protection.

Currently only respirators approved by NIOSH and the Mine Safety and Health Adminstration (MSHA) are permitted for use. If they are air-purifying respirators, the filtration device(s) must be rated as "high-efficiency"

Selecting the most appropriate respirator for each O&M task requires knowledge of the levels of airborne asbestos fibers and other possible air contaminants generated by the task or likely to be present where the task is performed. This knowledge is best gained through personal air monitoring conducted during worker performance of the actual task. (Obviously the workers must have respiratory protection while this initial personal air sampling is carried out.) In fact, OSHA and EPA require air monitoring under certain circumstances (see Chapter 6). To learn more about the different types of respirators available and the degree of protection they provide, see Appendix E. Owners may also wish to contact the nearest OSHA office, a local trained and qualified industrial hygienist (preferably Certified), or an occupational health professional for more information on respirators. The expertise of these specialists should be used to ensure proper selection, fit testing, and training of workers in respirator use.

Building owners and other facility managers may not be familiar with some of the terms used in discussions of respirators, airborne fiber levels, and related topics. Appendix E contains more information on these topics, and gives the minimum EPA-recommended levels of respiratory protection to be provided during typical O&M tasks.

For additional information on respirator programs, respirator types, and respirator use, the building owner or Asbestos Program Manager may want to use the following references

- "Respiratory Protection An Employer's Manual," NIOSH, October 1978;
- "A Guide to Respirator Protection for the Asbestos Abatement Industry" EPA/NIOSH, 1986;
- OSHA respirator standard (29 CFR 1910.134);
- OSHA asbestos regulations (29 CFR 1910.1001 and 1926.58);
- "Occupational Exposure Sampling Strategy Manual; NIOSH #77-173, January 1977.
- "Respirator Decision Logic," NIOSH, May 1987; and
- "NIOSH Guide to Industrial Respiratory Protection" September 1, 1987.

Protective Clothing/Worker Protection Programs In addition to the use of respirators, some O&M procedures may require workers to wear protective clothing. Most often, protective clothing is disposable and consists of coveralls, a head cover, and foot covers made of a synthetic fabric which does not allow asbestos fibers to pass through. This type of clothing prevents workers' regular clothing from becoming contaminated with asbestos fibers. Contaminated clothing could be taken home, creating a possible risk to the worker's family members.

OSHA and EPA regulations require workers to wear protective clothing whenever they are exposed, or likely to be exposed, to fiber levels above OSHA's permissible levels (see Chapter 6). It is important that workers be properly trained in the use, removal and disposal of protective clothing after use. All O&M activities may not require the use of protective clothing. It is important for the Asbestos Program Manager to assess this need on a case-by-case basis.

Basic O&M Procedures

Basic O&M procedures to minimize and/or contain asbestos fibers may include wet methods, use of mini-enclosures, use of portable power tools equipped with special local ventilation attachments, and avoidance of certain activities, such as sawing, sanding,

and drilling ACM. Maintenance activities can be divided into three categories with regard to their potential for disturbing ACM:

1. Those which are unlikely to involve any direct disturbance of ACM; for example, cleaning shelves or counter tops with a damp cloth.
2. Those which may cause accidental disturbance of ACM; for example, working on a fixture near a ceiling with surfacing ACM.
3. Those which involve intentional small-scale manipulation or disturbance of ACM; for example, removing a small segment of TSI ACM to repair a pipe leak.

The O&M program should include work practices for each type of ACM that is present in the building (surfacing, TSI, and miscellaneous) as well as for each type and category of maintenance activity performed (e.g., general cleaning, electrical work, plumbing).

Special work practices such as wet wiping, area isolation, and HEPA vacuuming, and the use of personal protective equipment such as respirators and protective clothing, may be needed where disturbance of ACM is likely. The need for these practices varies with the situation. For example, removing light fixtures located near surfacing ACM may disturb the material and might involve the use of special cleaning, possibly area isolation, and respiratory protection. Periodic emptying of a trash can near heavily encapsulated asbestos-containing plaster may not disturb the material at all, so no special work practices would generally be necessary These work practices and procedures are intended to ensure that disturbance of any ACM during O&M activities should be minimized, or carried out under controlled conditions when the disturbance is required by the nature of a specific O&M task.

In addition, ACM may readily release asbestos fibers into the air when certain mechanical operations are performed directly on it. For example, fiber releases can occur when workers are drilling, cutting, sanding, breaking, or sawing vinyl asbestos floor tile.

The *action* of drilling, cutting, abrading, sanding, chipping, breaking, or sawing is the critical factor here, since it is likely to cause a release of fibers. Maintenance or repair operations involving those actions should be eliminated or carefully controlled with basic O&M procedures in order to prevent or minimize asbestos fiber release.

Certain activities that occur in the vicinity of ACM can also cause damage which may result in asbestos fiber release. For example, maintenance and custodial stroll may damage ACM accidentally with broom handles, ladders, and fork lifts while performing other tasks. Activities performed in the vicinity of ACM should always be performed cautiously to prevent fiber release.

To summarize, if in doubt about the possibility of disturbing ACM during maintenance activities, adequate precautions should be taken to minimize fiber release; these will protect workers as well as the building environment. Basic O&M procedures, including use of wet methods and specially equipped tools, should be used to protect building occupants.

O&M Cleaning Practices

Special cleaning practices are appropriate for a building with exposed surfacing or thermal system insulation ACM, especially if the ACM is friable. If gradual deterioration or damage of ACM has occurred or is occurring, asbestos-containing dust or debris could be present. If the building inspection has determined that asbestos-containing dust or debris is present in some areas, then the O&M program should include special cleaning practices to collect residual asbestos dust. Routinely cleaning floors using wet methods is an example of one such practice. Custodial and maintenance workers in the course of normal work can also identify and report areas which are in need of special cleaning or repair. *Special cleaning techniques should supplement, not replace, repair or abatement actions for damaged, friable ACM.* The cleaning program should include an initial cleaning followed, as needed, by subsequent periodic or episodic cleanings.

If in doubt about the possibility of disturbing ACM during maintenance activities, adequate precautions should be taken to minimize fiber release.

Building owners and custodial and maintenance staff should ensure that special O&M cleaning is done correctly Proper cleaning is important for two reasons:

- The use of improper techniques to clean up asbestos debris caused by previous deterioration or damage may result in widespread contamination, and potentially increase airborne asbestos fiber levels in the building.
- Improper cleaning may cause damage to the ACM, thus releasing more airborne asbestos fibers.

O&M cleaning will involve the use of wet cleaning or wet-wiping practices to pick up asbestos fibers. Dry sweeping or dusting can result in asbestos fibers being re-suspended into the building's air and therefore should not be used. Once wet cloths, rags, or mops have been used to pickup asbestos fibers, they should be properly discarded as asbestos waste while still wet. They should not be allowed to dry out, since the collected fibers might be released at some later time when disturbed. The use of special vacuum cleaners, commonly referred to as HEPA vacuums, may be preferable to wet cleaning in certain situations. These vacuums are equipped with filters designed to remove very small particles or fibers — such as asbestos — by filtering those particles from the air passing through the vacuum. Since the exhaust air from an ordinary vacuum cleaner is not filtered sufficiently it is possible for tiny asbestos fibers to pass through the filter and back into the building air.

Special procedures are generally needed to minimize the spread of fibers in the building after asbestos fiber release occurs.

It is important for O&M workers to use caution when emptying HEPA vacuums and changing the filters. Exposures could result from such activities. Workers should move the HEPA vacuum to a physically isolated area of the facility and put on proper personal protective equipment before emptying the dust and debris into properly labeled, sealed, and leak-tight containers for disposal as asbestos-containing waste. When custodial workers do not work with ACM, trained maintenance workers can be used to empty the HEPA vacuums and change their filters. Decisions regarding special cleaning practices should be based on the building inspection and ACM assessment data, including the potential for ACM disturbance. In general, the building would not need special O&M cleaning when the building contains only nonfriable (not easily crumbled) ACM; ACM which has been encapsulated, encased, or enclosed behind airtight barriers; or ACM known to be undamaged/ undisturbed since the last special cleaning. Furthermore, where ACM is confined to a single room or area, special cleaning of just that area rather than other parts of the building may be sufficient.

If ACM has been released onto a carpeted area of a building, it may not always be possible to adequately clean the carpeted area. “Steam" cleaning and HEPA vacuuming methods are sometimes employed for this purpose. A preliminary study carried out by EPA in 1989 showed that hot water vacuums were more effective in carpet cleaning than HEPA vacuums, under the test conditions. Further field studies are planned to confirm these findings.

Here, a worker uses a HEPA vacuum (backpack type) to clean ACM debris from one of several carpeted areas in a room where surfacing material had fallen.



For carpets, successful cleaning will likely depend on factors such as the amount of ACM released onto the carpet, how long the situation has existed, traffic over the area, as well as the structure and composition of the carpet itself. It is prudent to evaluate individual situations on a case-by-case basis. The Asbestos program Manager should consider the need for workers engaged in cleaning asbestos fiber-contaminated carpets to wear proper respiratory protection. It may also be prudent to arrange for this type of cleaning to be done after normal working hours or when the facility is less occupied. Additionally it maybe more cost effective to properly dispose of contaminated carpets and other fabrics as asbestos-containing waste if a permanent asbestos control option is being undertaken in the building.

Where the ACM is damaged and located in an “air plenum” – where fibers can be transported by the heating, ventilation, or air conditioning (HVAC) system throughout the building – special cleaning practices may be extended to the entire building, including the HVAC system itself.

Procedures for Asbestos Fiber Release Episodes

Special procedures are generally needed to rninimize the spread of fibers throughout the building after asbestos fiber releases occur, such as the partial collapse of an ACM ceiling or wall. These procedures are needed whether the ACM disturbance is intentional or unintentional To provide building owners with some guidance, under EPA regulations for schools a “major fiber release” is defined as one involving more than three square or linear feet of ACM. The procedures to be followed will vary according to the site of the major release episode, the amount of ACM affected, the extent of fiber release from the ACM, the relationship of the release area to the air handling systems, and whether the release site is accessible to building occupants. Depending on the severity of the episode, asbestos abatement consultants and contractors may be needed to develop a strategy for conducting the cleanup operations.

In general, for major fiber releases, the area should be isolated by closing doors and/or erecting temporary barriers to restrict airflow as well as access to the site. Signs should be posted as necessary immediately outside the fiber release site to prevent persons not involved in the cleanup operation from inadvertently entering the area. If asbestos fibers could enter the HVAC system, the system should be modified to prevent fiber entry, or should be shut down and sealed off. The final step should be to employ thorough cleanup procedures to properly control the ACM, a careful visual inspection, and final clearance air monitoring to verify satisfactory cleanup.

Similar procedures can be used for much smaller fiber release events: where the amount of ACM is on the

order of three square or linear feet or less. The HEPA vacuuming, wet wiping, and worker protection procedures outlined in this guidance document, as well as wetting ACM wastes and properly placing them in an appropriate leak-tight container (such as a properly labeled, 6-mil-thick plastic bag), are examples of some of the procedures which could be used for both major and minor fiber releases.

It is important to recognize that different levels of training are needed for workers involved with fiber release episodes. A major release will generally require "asbestos abatement worker training," rather than the degree of training considered adequate for O&M workers.

EPA suggests that building owners and Asbestos Program Managers consult with state and local regulatory officials before establishing formal training procedures for each type of situation.

The following table should be useful in determining when to apply certain O&M work practices in buildings. The table illustrates the O&M work practices that should be used by custodial and maintenance staff, depending on the likelihood of ACM disturbance.

Summary of When to Apply Key O&M Work Practices

	Likelihood of ACM Disturbance		
	Contact Unlikely	**Accidental Disturbance Possible**	**Disturbance Intended or Likely**
Management Responsibilities			
Need Pre-Work Approval from Asbestos Program Manager	Review by Program Manager	Yes	Yes
Special Scheduling or Access Control	No	Yes	Yes
Supervision Needed	No	Initial, At Least	YES
HVAC System Modification	None	As Needed[1]	Shut Down[1]
Area Containment	None	Drop cloths, Mini-enclosures	Yes[2]
Personal Protection			
Respiratory Protection	Available For Use	Yes	Yes
Protective Clothing	None	Review by Asbestos Program Manager	Yes
Work Practices			
Use of Wet Methods	No	As Needed	Yes
Use of HEPA Vacuum	Available For Use	Available For Use	As Needed

1) In the area where work takes place
2) Type of containment may vary. For example, small-scale, short-duration tasks may not require full containment.

Recordkeeping

EPA recommends that building owners make available all written elements of the O&M program to the building's O&M staff as well as to tenants and other building occupants.

All the building asbestos management documents discussed in this Guide (inspection and assessment reports, O&M program plan, work practices and procedures, respirator use procedures, fiber release reports, application for maintenance work and work approval forms, evaluations of work affecting ACM, and reinspections/surveillance of ACM) should be stored in permanent files. In addition, for employees engaged in asbestos-related work, federal regulations (see Chapter 6) require that employers retain:

- personal air sampling records, for at least 30 years. Personal air samples are those collected in the worker's breathing zone during performance of work involving asbestos exposures.
- objective data used to qualify for exemptions from OSHA's initial monitoring requirements for the duration of the exemption.
- medical records for each employee subject to the medical surveillance program for the duration of their employment plus 30 years.
- all employee training records for one year beyond the last date of each worker's employment.

In addition, OSHA requires that employers provide to each employee their record of exposure and medical surveillance under the Records Access Standard (29 CFR 1910.20) and the Hazard Communication Standard (29 CFR 1910.1200). Seethe OSHA Construction Rule (29 CFR 1926.58) or the EPA Worker Protection Rule (40 CFR 763 Subpart G) for more details of recordkeeping requirements.

EPA recommends that building owners make available all written elements of the O&M program to the building's O&M staff as well as to tenants and other building occupants, if applicable. Building owners are also encouraged to consult with their legal counsel concerning appropriate recordkeeping strategies as a standard part of their O&M programs. Additionally state and local regulations may also require additional recordkeeping procedures.

Chapter Summary

Although the elements discussed in this chapter should appear in any O&M program, the extent to which each applies will vary depending on the building type, the type of ACM present, and the ACM's location and physical condition. To achieve its objectives an O&M program should include the following:

A notification program to inform building occupants, workers, and tenants about the location of ACM and how to avoid disturbing ACM.

Periodic surveillance and reinspection of ACM at regular intervals by trained workers or properly trained inspectors. Air monitoring to detect airborne asbestos fibers in the building may provide useful supplemental information when conducted along with a comprehensive visual and physical ACM inspection/ reinspection program. Air samples are most accurately analyzed using transmission electron microscopy (TEM).

A "work Control/permit" system, which some building owners have used successfully to control work that could disturb ACM. This system requires the person requesting work to submit a Job Request Form to the Asbestos Program Manager before any work is begun.

O&M work practices to avoid or minimize fiber release during activities affecting ACM.

Recordkeeping. OSHA and EPA have specific requirements for workers exposed to asbestos.



What O&M Training Is Necessary?

Types of Training

Training of custodial and maintenance workers is one of the keys to a successful O&M program. If building owners do not emphasize the importance of well-trained custodial and maintenance personnel, asbestos O&M tasks may not be performed properly This could result in higher levels of asbestos fibers in the building air and an increased risk faced by both building workers and occupants.

OSHA and EPA require a worker training program for all employees exposed to fiber levels (either measured or anticipated) at or above the action level (0.1 f/cc, 8-hour *time-weighted average*– the TWA) and/or the excursion limit (1.0 f/cc, 30-minute TWA—see Chapter 6). According to the EPA regulations governing schools, all school stall custodial and maintenance workers who conduct any activities that will result in the disturbance of ACM must receive 16 hours of O&M training. Some states and municipalities may also have specific training requirements for workers who may be exposed to asbestos, or who work in a building with ACM present.

With proper training, custodial and maintenance staff can successfully deal with ACM in place, and greatly reduce the release of asbestos fibers. Training sessions should provide basic information on how to deal with all types of maintenance activities involving ACM. However, building owners should also recognize that O&M workers in the field often encounter unusual, "non-textbook" situations. As a result, training should provide key concepts of asbestos hazard control. If these concepts are clearly understood by workers and their supervisors, workers can develop techniques to address a specific problem in the field. Building owners who need to provide O&M training to their custodial and maintenance staff should contact an EPA environmental assistance center (see Appendix D) or equally qualified training organization for more information.

At least three levels of maintenance worker training can be identified

LEVEL 1: AWARENESS TRAINING. For custodians involved in cleaning and simple maintenance tasks where ACM may be accidentally disturbed.

For example, fixing a light fixture in a ceiling covered with surfacing ACM. Such training may range from two to eight hours, and may include such topics as:

- Background information on asbestos.
- Health effects of asbestos.
- Worker protection programs.
- Locations of ACM in the building.
- Recognition of ACM damage and deterioration.
- The O&M program for that building.
- Proper response to fiber release episodes.

Training of custodial and maintenance workers is one of the keys to a successful O&M program.

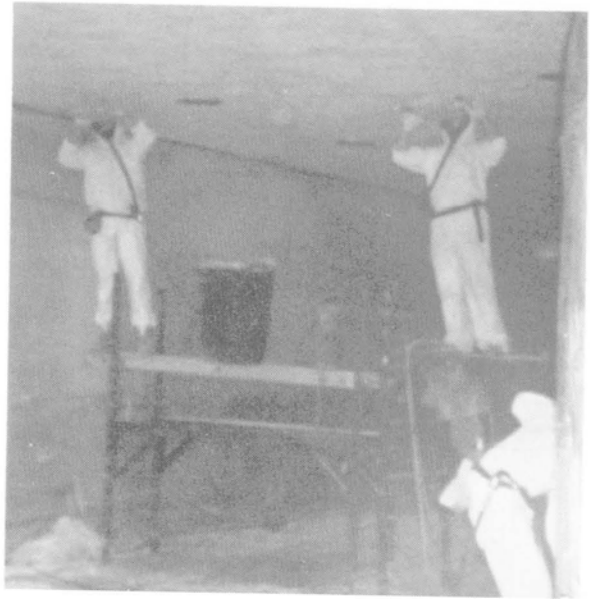


A properly protected and trained worker conducts a glovebag removal job on a section of thermal system insulation. Under a proper operations and maintenance program, any worker involved in such activities would have Level 1 and 2 training.

LEVEL 2: SPECIAL O&M TRAINING. For maintenance workers involved in general maintenance and asbestos material repair tasks.

For example, a repair or removal of a small section of damaged TSI, or the installation of electrical conduit in an air plenum containing ACM or ACM debris. Such training generally involves at least 16 hours. This level of training usually involves more detailed discussions of the topics included in Level 1 training as well as:

- Federal, state, and local asbestos regulations.
- Proper asbestos-related work practices.
- Descriptions of the proper methods of handling ACM, including waste handling and disposal.
- Respirator use, care, and fit-testing.
- Protective clothing donning, use, and handling.
- Hands-on exercises for techniques such as glovebag work and HEPA vacuum use and maintenance.
- Appropriate and proper worker decontamination



This is an example of a large-scale asbestos removal project (note missing scaffold safety rails). Such projects are well beyond the scope of an O&M program. The EPA NESHAP regulations require that asbestos materials be removed from buildings prior to demolition or renovation when the asbestos will be disturbed.

LEVEL 3: ABATEMENT WORKER TRAINING. For workers who may conduct asbestos abatement.

For example, conducting a removal job, constructing an enclosure, or encapsulating a surface containing ACM. This work involves direct, intentional contact with ACM. The recognized "abatement worker" training courses approved by EPA or states, under the EPA AHERA model accreditation plan for schools, which involve 24 to 32 hours of training, would fulfill this level of training.

If this level of training is provided to in-house staff, it may save time and money in the long run to use these individuals to perform such activities. This level of training is much more involved than Levels 1 and 2, although it should include some of the same elements (e.g., health effects of asbestos). It will typically include a variety of specialized topics, such as:

- Pre-asbestos abatement work activities.
- Work area preparation.
- Establishing decontamination units.
- Personal protection, including respirator selection, use, fit-testing, and protective clothing.
- Worker decontamination procedures.
- Safety considerations in the abatement work area.
- A series of practical hands-on exercises.
- Proper handling and disposal of ACM wastes.

The Asbestos Program Manager should consider conducting the training program for Levels 1 and 2 if he or she has sufficient specific asbestos knowledge and training. If the Asbestos Program Manager does not conduct the training, the building owner should hire an outside consultant or send workers to an appropriate O&M training course. A trained (preferably Certified) industrial hygienist or equally qualified safety and health professional should conduct the training on respirator use and fit-testing. A health professional should conduct the training on health effects.

OSHA or EPA Regional Offices, as well as state and local agencies and professional associations, may be able to suggest courses or direct you to listings of training providers for each of the three levels. Appendix D provides the addresses and/or phone numbers for OSHA, EPA, and EPA-sponsored training providers.

Where custodial and maintenance services are performed by a service company under contract, or where some installation or repairs are performed by employees of trade or craft contractors and subcontractors, those workers may need to have training at level 1, 2, or 3 as appropriate for their work. The Asbestos Program Manager or building owner should verify that these employees receive appropriate training before they begin any work.

In summary, good training is crucial to the success of an O&M program. Strong support for O&M training by the building owner should convince custodial and maintenance workers that following the appropriate work procedures is critical to protecting their own health as well as the health of other building occupants.

Chapter Summary

Properly trained custodial and maintenance workers are critical to a successful O&M program. The following items are highlighted training requirements:

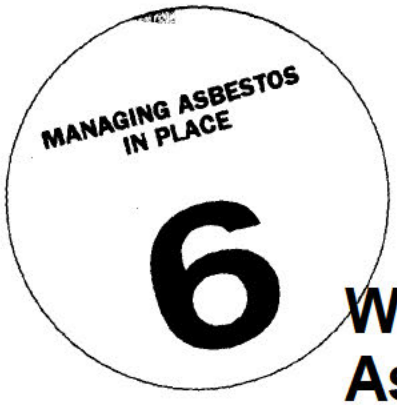
- OSHA and EPA require worker training program for all employees exposed to fiber levels at or above the action level (0.1 f/cc, 8-hr. TWA) and/or the excursion limit (1.0 f/cc, 30-minute TWA – see Chapter 6).
- Some states and municipalities may have specific worker training requirements.
- At least three levels of maintenance worker training can be identified:

  Level 1 Awareness training for workers involved in activities where ACM may be accidentally disturbed. May range from 2-8 hours.

  Level 2 Special O&M training for maintenance workers involved in general maintenance and incidental ACM repair tasks. At least 16 hours.

  Level 3 Abatement worker training for workers who may conduct asbestos abatement. This work involves direct, intentional contact with ACM. "Abatement worker" training courses that involve 24 to 32 hours of training fulfill this level of training.

Strong support by the building owner can convince workers that following appropriate procedures is critical to protecting their own health as well as the health of other building occupants.



What Regulations Affect Asbestos Management Programs in Buildings, Especially O&M Programs?

Federal, State, and Local Regulations Affecting O&M Programs

Building owners are governed by a variety of federal, state, and local regulations which influence the way they must deal with ACM in their facilities. Some of these regulations, particularly at the state and local level, may change frequently Building owners should contact their state and local government agencies, in addition to organizations such as the National Conference of State Legislatures (NCSL), the National Institute of Building Sciences (NIBS), or EPA environmental assistance centers, for updated information on these requirements. (Appendix D lists phone numbers for these organizations.)

Building owners are governed by a variety of federal, state, and local regulations which influence the way they must deal with ACM in their facilities.

OSHA Regulations and the U.S. EPA Worker Protection Rule

There are several important Occupational Safety and Health Administration (OSHA) and EPA regulations that are designed to protect workers. They are summa rized here, as guidance. OSHA has specific requirements concerning worker protection and procedures used to control ACM. These include the OSHA construction industry standard for asbestos (29 CFR 1926.58), which applies to O&M work, and the general industry asbestos standard (29 CFR 1910.1001). State-delegated OSHA plans, as well as local jurisdictions, may impose additional requirements.

For most operations and maintenance activities in building areas where only non-friable ACM is present or where friable ACM is in good condition, applicable OSHA permissible exposure limits are not likely to be exceeded. However, it is possible that some O&M activities will disturb ACM to such an extent that the OSHA limits are exceeded, unless good work practices are followed.

The OSHA standards generally cover private sector workers, and public sector employees in states which have an OSHA state plan. Public sector employees, such as city or county government employees, or certain school employees, who are not already subject to a state OSHA plan are covered by the EPA "Worker Protection Rule" (Federal Register: February 25, 1987; 40 CFR 763 Subpart G, Asbestos Abatement Projects; Worker Protection, Final Rule). *Note: As this document goes to press, 0SHA is considering a substantial number of changes to its regulations.*

The OSHA standards and the EPA Worker Protection Rule require employers to address a number of items which are triggered by exposure of employees to asbestos fibers. Exposure is discussed in terms of fibers per cubic centimeter (cc) of air. A cc is a volume approximately equivalent to that of a sugar cube.

Two main provisions of the regulations fall into the general category of "Permissible Exposure Limits (PELs)" to airborne asbestos fibers. They are:

1. **8-Hour Time-weighted average limit (TWA)–** 0.2 fiber per cubic centimeter (f/cc) of air based on an 8-hour time-weighted average (TWA) sampling period. This is the maximum level of airborne asbestos, on average, that any employee may be exposed to over an 8-hour period (normal work shift).
2. **Excursion limit (EL) –** 1.0 f/cc as averaged over a sampling period of 30 minutes.

These levels trigger mandatory requirements, which include the use of respirators and protective clothing, the establishment of "regulated areas," the posting of danger signs as well as the use of engineering controls and specific work practices.

OSHA regulations also establish an *"Action Level":* 0.1 f/cc for an 8-hour TWA. Employee training is required once the action level of 0.1 f/cc and/or the "Excursion Limit" is reached. This training must include topics specified by the OSHA rules. If an employee is exposed at or above the action level for a period of 30 days or more in a calendar year, medical surveillance is required according to the OSHA construction industry asbestos standard.

OSHA also requires medical examinations under its "General Industry Standard" for any employee exposed to fiber levels in the air at or above the OSHA "action level" (0.1 f/cc) and/or the "excursion limit" (1. Of/cc). In both cases – the action level and excursion limit – the OSHA medical examination requirement applies if the exposure occurs for at least one day per year.

The OSHA "Construction Industry Standard" (29 CFR 1926.58) for asbestos, is generally applicable for the workers who carry out the kinds of work discussed in this O&M guidance document. The OSHA construction industry asbestos standard applies to demolition and asbestos removal or encapsulation projects, as well as to repair, maintenance, alteration, or renovation if ACM is involved. ACM spills or emergency clean-up actions are also covered by this regulation.

According to those regulations, participation in a medical surveillance program is required for any employee who is required to wear a negative pressure, air-purifying respirator. Preplacement, annual, and termination physical exams are also required for these employees. However, a termination exam is only necessary under the construction industry standard (which applies to custodial and maintenance employees) if a physician recommends it. While not mandatory EPA and NIOSH recommend physical examinations, including cardiac and pulmonary tests, for any employee required to wear a respirator by the building owner. These tests determine whether workers will be unduly stressed or uncomfortable when using a respirator.

Additional requirements of the OSHA asbestos standards, such as the use of air filtration systems and hygiene facilities, involve procedures which are most applicable to large-scale asbestos abatement projects. However, these rules also include a number of recommendations for procedures which might be appropriate for a variety of O&M programs for buildings.

Small-scale, Short-duration Projects

"Appendix G" which is specified as a non-mandatory section to the OSHA regulation 29 CFR 1926.58, may become mandatory under certain circumstances where "small-scale, short-duration" asbestos projects are conducted. These projects are not precisely defined in terms of either size or duration, although their nature and scope are illustrated by examples presented in the text of the regulation. Properly trained maintenance workers may conduct these projects. Examples may include removing small sections of pipe insulation or covering for pipe repair, replacing valves, installing electrical conduits, or patching or removing small sections of drywall. OSHA issued a clarification of the definition of a "small-scale, short-duration" (SS/SD) project in a September 1987 asbestos directive. The directive focuses on intent, stating that in SS/SD projects, the removal of ACM is not the primary goal of the job. If the purpose of a small-scale, short-duration project is maintenance, repair, or renovation of the equipment or surface behind the ACM—not abatement of ACM—then the appendix provisions may apply If the intent of the work is abatement of the ACM, then the full-scale abatement control requirements apply

In any event, this appendix section of the OSHA construction standard outlines requirements for the use of certain engineering and work practice controls such as glovebags, mini-enclosures, and special vacuuming techniques. Similar information on these procedures may be found in the EPA's AHERA regulations for schools. (See final AHERA rule, Appendix B, for SS/SD projects.)

U.S. EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR 61 Subpart M)

EPA's rules concerning the application, removal, and disposal of ACM, as well as manufacturing, spraying and fabricating of ACM, were issued under the asbestos NESHAP. The asbestos NESHAP regulation governs asbestos demolition and renovation projects in all facilities. The NESHAP rule usually requires owners or operators to have all friable ACM removed before a building is demolished, and may require its removal before a renovation. For renovation projects where friable ACM will be disturbed, the NESHAP rule may require appropriate work practices or procedures for the control of emissions. It is prudent to note that any ACM which may become friable poses a potential hazard that should be addressed. The building owner should consider that in many instances, the removal of friable ACM prior to demolition could be less expensive than removals while the building is still occupied and being used. *Some revisions to the current. NESHAP rule are anticipated by the end of 1.990.*

In general applicable OSHA permissible exposure limits are not likely to be exceeded for most O&M activities in building areas where only non-friable ACM is present or where friable ACM is in good condition.

Notification

EPA or the state (if the state has been delegated authority under NESHAP) must be notified before a building is demolished or renovated. The following information is required on the NESHAP notice:

1. Name and address of the building owner or manager;
2. Description and location of the building;
3. Estimate of the approximate amount of friable ACM present in the facility;
4. Scheduled starting and completion dates of ACM removal;
5. Nature of planned demolition or renovation and method(s) to be used;
6. Procedures to be used to comply with the requirements of the regulation; and
7. Name, address, and location of the disposal site where the friable asbestos waste material will be deposited.

Depending on project size, EPA or the state must be notified before a building is demolished or renovated.

The notification requirements do not apply if a building owner plans renovation projects which will disturb less than the NESHAP limits of 160 square feet of friable ACM on facility components or 260 linear feet of friable ACM on pipes (quantities involved over a one-year period). For renovation operations in which the amount of ACM equals or exceeds the NESHAP limits, notification is required as soon as possible.

Emissions Control and Waste Disposal

The NESHAP asbestos rule prohibits visible emissions to the outside air by requiring emission control procedures and appropriate work practices during collection, packaging, transportation or disposal of friable ACM waste. All ACM must be kept wet until sealed in a leak-tight container that includes the appropriate label. The following table provides a simplified reference for building owners regarding the key existing NESHAP requirements.

Resource Conservation and Recovery Act Regulations (RCRA); and Comprehensive Environmental Response, Compensation, and Liability Act Regulations (CERCLA, or "Superfund")

Under expanded authority of RCRA, a few states have classified asbestos-containing waste as a hazardous waste, and require stringent handling, manifesting, and disposal procedures. In those cases, the state hazardous waste agency should be contacted before disposing of asbestos for approved disposal methods and recordkeeping requirements, and for a list of approved disposal sites.

Friable asbestos is also included as a hazardous substance under EPA's CERCLA regulations. The owner or manager of a facility (e.g., building, installation, vessel, landfill) may have some reporting requirements. Check with your EPA Regional Office for further information. (See Appendix D for telephone numbers.)

The Asbestos Hazard Emergency Response Act Regulations (AHERA)

In October 1987, EPA issued final regulations to carry out the Asbestos Hazard Emergency Response Act of 1986 (AHERA). The AHERA regulatory requirements deal *only with public and private elementary and secondary school buildings.* The regulations require schools to conduct inspections, develop comprehensive asbestos management plans, and select asbestos response actions to deal with asbestos hazards. The AHERA rules *do not* require schools to remove ACM.

A key element of the AHERA regulations requires schools to develop an O&M program if friable ACM is present. The AHERA O&M requirements also cover non-friable ACM which is about to become friable. For example, drilling through an ACM wall will likely result in friable ACM. Under the AHERA O&M provisions, schools must carry out specific O&M procedures which provide for the clean-up of any ACM releases and help ensure the general safety of school maintenance and custodial workers, as well as all other school building occupants. The AHERA regulation's O&M requirements mandate that schools employ specific work practices including wet wiping, HEPA vacuuming, proper waste disposal procedures, and specific training for custodial and maintenance employees who work in buildings with ACM.

U.S. EPA Asbestos Ban and Phaseout Rule

Bans on some uses and applications of asbestos under the Clean Air Act were briefly described in Chapter 1. In July 1989, under the Toxic Substances Control Act (TSCA), EPA promulgated an Asbestos Ban and Phaseout Rule. The complete rule was published in the *Federal Register* on July 12,1989.

Beginning in 1990 and taking effect in three stages, the rule prohibits the importation, manufacture, and processing of 94 percent of all remaining asbestos products in the United States over a period of seven years.

Existing NESHAP Requirements Summary*

	Demolition		Renovation	
AMOUNT* (in 1 yr.)	> 260 ln. ft. or > 160 sq. ft.	<260 ln. ft. or <160 sq. ft.	> 260 ln. ft. or > 160 sq. ft.	<260 ln. ft. or > 160 sq. ft.
NOTIFICATION	YES	YES	YES	NOT REQUIRED
HOW FAR IN ADVANCE*	10 DAYS	20 DAYS	AS SOON AS POSSIBLE	NOT REQUIRED
EMISSION CONTROLS (Work Practices)	YES	NOT REQUIRED	YES	NOT REQUIRED
DISPOSAL STANDARD	YES	NOT REQUIRED	YES	NOT REQUIRED

*May be changed on promulgation of Revised NESHAP Rule in 1990

Chapter Summary

A variety of federal, state, and local regulations govern the way building owners must deal with ACM in their facilities. State and local regulations maybe more stringent than federal standards and often change rapidly Building owners should periodically check with the appropriate Federal, State, and local authorities to determine whether any new asbestos regulations have been developed or whether current regulations have been amended. Specific federal regulations that may affect asbestos-related tasks and/or workers are highlighted here:

- OSHA Construction Industry Standard for Asbestos (29 CFR 1926.58).
- OSHA General Industry Standard for Asbestos (29 CFR 1910.1001).
- OSHA Respiratory Protection Standard (29 CFR 1910.134).
- EPA Worker Protection Rule (40 CFR 763 Subpart, G).
- EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR 61 Subpart M).
- EPA Asbestos Hazard Emergency Response Act (AHERA) Regulations (40 CFR 763 Subpart E),
- EPA Asbestos Ban and Phaseout Rule (40 CFR 763 Subpart I).

Appendix A.

Glossary of Terms

ACM	Asbestos-Containing Material. Any material containing more than one percent asbestos.
Asbestos Program Manager	A building owner or designated representative who supervises all aspects of the facility asbestos management and control program.
Air Plenum	Any space used to convey air in a building or structure. The space above a suspended ceiling is often used as an air plenum.
Asbestos Abatement	Procedures to control fiber release from asbestos-containing materials in a building or to remove it entirely These may involve removal, encapsulation, repair, enclosure, encasement, and operations and maintenance programs.
Delamination	Separation of one layer from another.
EPA	U.S. Environmental Protection Agency
Friable Asbestos	Any materials that contain greater than one percent asbestos, and which can be crumbled, pulverized, or reduced to powder by hand pressure. This may also include previously non-friable material which becomes broken or damaged by mechanical force.
Glovebag	A polyethylene or polyvinyl chloride bag-like enclosure affixed around an asbestos-containing source (most often, TSI) so that the material maybe removed while minimizing release of airborne fibers to the surrounding atmosphere.
HEPA Filter	High-Efficiency Particulate Air Filter. Such filters are rated to trap at least 99.97% of all particles 0.3 microns in diameter or larger.
Industrial Hygienist	A professional qualified by education, training, and experience to anticipate, recognize. evaluate and develop controls for occupational health hazards.
Medical Surveillance	Aperiodic comprehensive review of a worker's health status. The required elements of an acceptable medical surveillance program are listed in the Occupational Safety and Health Administration standards for asbestos.
Miscellaneous ACM	Interior asbestos-containing building material on structural components, structural members or fixtures, such as floor and ceiling tiles; does not include surfacing material or thermal system insulation.
NESHAP	National Emission Standard for Hazardous Air Pollutants-EPA Rules under the Clean Air Act.
NIOSH	The National Institute for occupational Safety and Health, which was established by the Occupational Safety and Health Act of 1970. Primary functions of NIOSH are to conduct research, issue technical information, and test and certify respirators.
Personal Air Samples	An air sample taken with a sampling pump directly attached to the worker with the collecting filter and cassette placed in the worker's breathing zone. These samples are required by the OSHA asbestos standards and the EPA Worker Protection Rule.
Prevalent Level Samples	Air samples taken under normal conditions (also known as ambient background samples).
Surfacing ACM	Asbestos-containing material 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.
TSI	Thermal system insulation – asbestos-containing material applied to pipes, fittings, boilers, breeding, tanks, ducts or other interior structural components to prevent heat loss or gain or water condensation.
TWA	Time-weighted Average. In air sampling, this refers to the average air concentration of contaminants during a particular sampling period.

Appendix B.

Sample Recordkeeping Form:

Form 1. A sample form for recording information during ACM reassessament.

Reinspection of Asbestos-Containing Materials

Location of asbestos-containing material (address, building, room, or general description]

_____

_____

_____

_____

Type of asbestos-containing material(s):

1. Sprayed-or troweled-on ceilings or walls
2. Sprayed-or troweled-on structural members
3. Insulation on pipes, tanks, or boiler
4. Other (describe)

_____

_____

Abatement Status:

1. The material has been encapsulated____ , enclosed ____ , neither ____ , removed ____ .

Assessment:

1. Evidence of physical damage _____

_____

2. Evidence of water damage: _____

_____

3. Evidence of delamination or other damage: _____

_____

4. Degree of accessibility of the material: _____

_____

5. Degree of activity near the material: _____

_____

6. Location in an air plenum, air shaft, or airstream: _____

_____

7. Other observations (including the condition of the encapsulant or enclosure, if any): _____

_____

***Recommended Action:** _____

_____

Signed: _____ Date: _____
(evaluator)

Form 2. A sample application form for maintenance work approval.

Job Request Form for Maintenance Work

Name: _____ Date: _____

Telephone No. _____ Job Request No. _____

Requested starting date: _____ Anticipated finish date: _____

Address, building, and room number(s) (or description of area) where work is to be performed:

_____

_____

_____

_____

Description of work

_____

_____

_____

_____

_____

Description of any asbestos-containing material that might be affected, if known (include location and type):

_____

_____

_____

_____

_____

Name and telephone number of requestor:

_____

Name and telephone number of supervisor

_____

Submit this application to

_____

(The Asbestos Program Manager)

NOTE An application must be submitted for all maintenance work whether or not asbestos-containing material might be affected. An authorization must then be received before any work can proceed.

_____ Granted (Job Request No._____)
_____ With conditions*
_____ Denied

*Conditions _____

_____

Form 3. A sample maintenance work authorization form.

Maintenance Work Authorization Form

No._____

AUTHORIZATION

Authorization is given to proceed with the following maintenance work:

_____

_____

_____

_____

_____

_____

_____

_____

PRESENCE OF ASBESTOS-CONTAINING MATERIALS

_____ Asbestos-containing materials are not present in the vicinity of the maintenance work.

_____ ACM is present, but its disturbance is not anticipated however, if conditions change, the Asbestos Program Manager will re-evaluate the work request prior to proceeding.

_____ ACM is present, and maybe disturbed.

Work Practices if Asbestos-Containing Materials Are Present

The following work practices shall be employed to avoid or minimum disturbing asbestos:*

_____

_____

_____

_____

_____

Personal Protection if Asbestos-Containing Materials Are Present**

The following equipment/clothes shall be used/worn during the work to protect workers:

_____

_____

_____

_____

(manuals on personal protection can be referenced)

Special Practices and/or Equipment Required:

_____

_____

Signed:_____ Date:_____

(Asbestos Program Manager)

Form 4. A sample work evaluation form

This evaluation covers the following maintenance work:

Location of work (address, building, room number(s), or general description):

Date(s) of work

Description of work

Work approval form number:

Evaluation of work practices employed to minimize disturbance of asbestos:

Evaluation of work practices employed to contain released fibers and to clean up the work area:

Evaluation of equipment and procedures used to protect workers:

Personal air monitoring results; (i-house worker or contract?)

Worker name Results:

Worker name Results:

Handling or storage of ACM waste:

signed Date:
(Asbestos Program Manager)

Appendix C

Illustrative Organization Chart

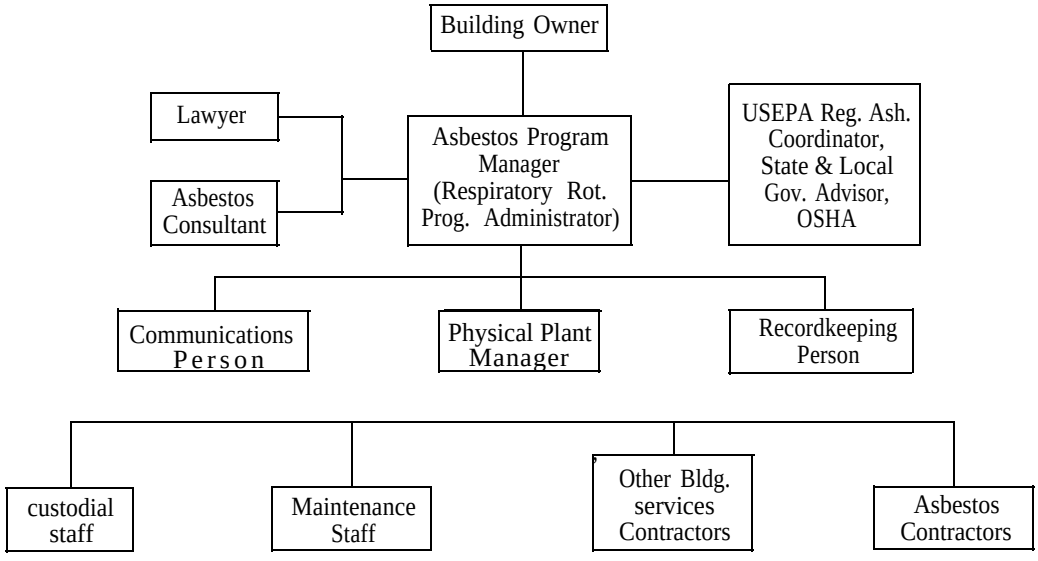


Figure 1. A *sample* organization for a building owner with a large in-house management staff. Shaded boxes indicate outside assistance.

Owners and Managers Who Employ an Extensive In-house Management Staff

IN-HOUSE STAFF (FIGURE 1)

Asbestos Program Manager: Has authority and overall responsibility for the asbestos control program. May develop the O&M program. Coordinates all activities. May also administer the respiratory protection program.

Physical Plant Manager: (may also be the Asbestos Program Manager) Participates in establishing work practices for cleaning and maintenance activities, and in training custodial and maintenance staff to use them. Assists in implementing the O&M program and in conducting periodic reinspection of the ACM. Ensures that outside contractors follow O&M procedures.

Communications Person: (Public Affairs Officer, Nurse, Physician, Industrial Hygienist) Assists in preparation and distribution of information about ACM in the building. Person should be a good speaker and communicator.

Recordkeeping Person: (Executive Assistant, Secretary) Responsible for maintaining records.

OUTSIDE ASSISTANCE

EPA Regional Asbestos Coordinator, NESHAP Coordinator and State/Local Government Advisors: Provide getter-id guidance and answer specific questions.

OSHA Regional Office: May he helpful in answering questions about existing regulations, and providing guidance for worker protection.

Asbestos Consultant(s)*: (Industrial Hygienists, Health Professionals, Architects, Engineers, and others) May assist in various aspects of the asbestos O&M program, including its development and implementation. May also conduct material inspections and provide work practice recommendations.

Lawyer: Provides advice on legal requirements (such as laws and statutes) and liability aspects of the program.

Asbestos Contractor*: May provide services for ACM abatement and for building decontamination following a fiber release episode.

*It is important for owners and Asbestos Program Manager's to consider potential "conflict of interest" issues pertaining to those persons or firms used to sample, inspect, assess, analyze, recommend response actions, design response actions, and conduct asbestos response actions.

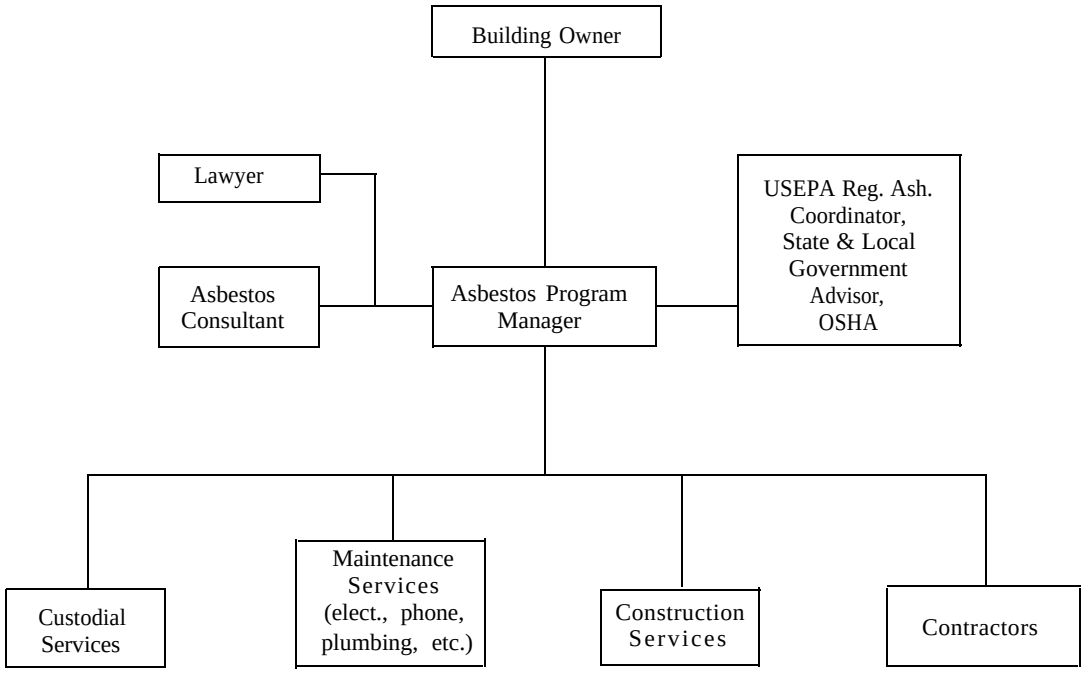


Figure 2. A *sample* organization for owners of buildings where services are provided by contract. Shaded boxes indicate outside assistance.

Owners and Managers Who Contract For Services

IN-HOUSE STAFF (FIGURE 2)

Asbestos Program Manager: Has overall responsibility for the asbestos control program. May develop and implement the O&M program. Establishes training and experience requirements for contractor's workers. Supervises and enforces work practices with assistance of work crew supervisors. Conducts periodic reinspection and responsible for recordkeeping. This person should be properly trained in O&M program development and implementation (see Chapter 5).

OUTSIDE ASSISTANCE

EPA Regional Asbestos Coordinator and State/Local Government Advisors: Provide general guidance and answer specific questions,

OSHA Regional Office: May be helpful in answering questions about existing regulations and providing guidance for worker protection.

Asbestos Consultant(s)*: (Industrial Hygienists, Health Professionals, Architects, Engineers, and others) May assist Asbestos Program Manager in various aspects of the asbestos O&M program, including development and implementation. May also conduct the inspection and provide work practices recommendations.

Lawyer: Provides advice on legal requirements (laws and statutes) and liability aspects of the program.

Asbestos Contractor*: May provide services for ACM abatement and building decontamination following a fiber release episode.

*It is important for owners and Asbestos Program Manager's to consider potential "conflict of interest" issues pertaining to those persons or firms used to sample, inspect, assess, analyze, recommend response actions, design response actions, and conduct asbestos response actions.

APPENDIX D.

Additional Assistance and Training

EPA REGIONAL CONTACTS

Additional assistance can be obtained from your U.S. EPA Regional Asbestos Coordinators, NESHAP Regional Coordinators, and OSHA Regional Offices. Their telephone numbers are listed below

EPA Region 1: (CT,ME,MA,NH,RI,VT)
Asbestos Coordinator (617) 565-3835
NESHAP Coordinator (617) 565-3265

EPA Region II: (NJ,NY,PR,VI)
Asbestos Coordinator (201) 321-6671
NESHAP Coordinator (212) 264-6770

EPA Region III: (DE,DC,MD,PA,VA,WV)
Asbestos Coordinator (215) 597-3160
NESHAP Coordinator (215) 597-6550

EPA Region IV: (AL,FL,GA,KY,MS,NC,SC,TN)
Asbestos Coordinator (404) 347-5014
NESHAP Coordinator (404) 347-2904

EPA Region V: (IL,IN,MI,MN,OH,WI)
Asbestos Coordinator (312) 886-6003
NESHAP Coordinator (312) 353-2088

EPA Region VI: (AR,LA,NM,OK,TX)
Asbestos Coordinator (214) 655-7244
NESHAP Coordinator (214) 655-7229

EPA Region VII: (IA,KS,MO,NE)
Asbestos Coordinator (913) 551-7020
NESHAP Coordinator (913) 551-7020

EPA Region VIII: (CO,MT,ND,SD,UT,WY)
Asbestos Coordinator (303) 293-1442
NESHAP Coordinator (303) 294-7685

EPA Region IX: (AZ,CA,HI,NV,AS,GU)
Asbestos Coordinator (415) 556-5406
NESHAP Coordinator (415) 556-5526

EPA Region X: (AK,ID,OR,WA)
Asbestos Coordinator (206) 442-4762
NESHAP Coordinator (206) 442-1757

OSHA REGIONAL OFFICES

Region I – Boston, MA:(617) 223-6710
Region II – New York, NY: (212) 944-3432
Region III – Philadelphia, PA (215) 596-1201
Region IV – Atlanta, GA (404) 347-3573
Region V – Chicago, IL: (312) 353-2220
Region VI – Dallas, TX: (214) 7674731
Region VII – Kansas City, MO (816) 374-5861
Region VIII – Denver, CO: (303) 844-3061
Region IX – San Francisco, CA: (415) 995-5672
Region X – Seattle, WA (206) 442-5930

Toxic Substances Control Act (TSCA) Assistance Hotline

Copies of the EPA Guidance Documents, Technical Bulletins, and other publications cited here can be obtained by calling the TSCA Assistance Hotline, in Washington, D.C., at: (202) 554-1404.

Approved Training Centers

Certain training centers and satellite centers were initially funded by EPA to develop asbestos training courses. They and other training providers approved by EPA or states, offer courses for professionals such as asbestos inspectors and management planners involved with ACM detection and control, for asbestos abatement project designers, project supervisors and abatement workers, and others. In general, qualified professionals trained as inspectors and asbestos management planners would be good choices to design an O&M plan. Original training centers are located at the following sites:

Georgia Institute of Technology
GTRI/EDL/ESTD
29 O'Keefe Building
Atlanta, GA 30332
(404) 894-3806

University of Kansas
Asbestos Training Center
6600 College Blvd. Suite 315
Overland Park, KS 66211
(913) 491-0181

Pacific Asbestos
Information Center
University CA/Extension
2223 Fulton St.
Berkeley, CA 94720
(415) 643-7143

Tufts University
Curtis Hall
Asbestos Information Center
474 Boston Avenue
Medford, MA 02155
(617) 381-3531

University of Illinois at Chicago
Midwest Asbestos Information Center
BOX 6998
Chicago, IL 60680
(312) 996-6904

Additional training providers are listed in the *Federal Register* on a regular basis. Call (202) 554-1404 for information. In addition, information on how to receive a copy of an O&M Course produced by an EPA contractor maybe obtained at the same number.

OTHER ORGANIZATIONS

National Conference of State Legislatures (NCSL)
Denver, CO – (303) 623-7800
National Institute of Building Sciences (NIBS),
Washington, D.C. – (202) 289-7800
American Board of Industrial Hygiene (ABIH),
Lansing, MI – (517) 321-2638
National Institute for Standards and Technology (NIST),
Gaithersburg, MD – (contact for lab accreditation) –
(301) 975-4016

APPENDIX E:

Respiratory Protection Recommendations

EPA recommends that the following guidelines be followed for respiratory protection during various custodial and maintenance tasks. These guidelines are issued to cover tasks that do not always create routine fiber levels high enough to trigger OSHA respiratory protection requirements. Therefore, building owners should note they go beyond OSHA requirements.

- **Routine maintenance where contact with ACM is unlikely.** No respiratory protection required. (Air-purifying respirator with high-efficiency filters should be available if needed: half-face or full facepiece).

- **Routine maintenance where there is reasonable likelihood of ACM disturbance.** Air-purifying respirator with high-efficiency filters (half-face or full facepiece).

- **Maintenance or repair involving intentional small-scale disturbance of ACM.** Powered air-purifying respirator with high-efficiency filters, or air-purifying respirator with high-efficiency filters (half-face or full facepiece). If glove bags are used to contain the ACM during disturbance, either half-face or full facepiece air-purifying respirators with high-efficiency filters may be used.

- **Any O&M activity requiring sawing, cutting, drilling, abrading, grinding, or sanding ACM.** (NOTE: specially equipped tools with local exhaust ventilation should be used for these activities. See 29 CFR 1910.) Powered air-purifying respirator with high-efficiency filters, or full facepiece, air-purifying respirator equipped with high-efficiency filters should be used.

- **Cleanup after a minor asbestos fiber release.** Air-purifying respirator with high-efficiency filters (half-face or full facepiece).

- **Cleanup after a major asbestos fiber release.** Air-supplied respirators, either the "Type C" airline respirator equipped with a backup high-efficiency filter or SCBA (Self-Contained Breathing Apparatus).

The U.S. EPA, in collaboration with NIOSH, has issued a guidance document, "A Guide to Respiratory Protection for the Asbestos Abatement Industry" which recommends levels of respiratory protection for those engaged in large-scale asbestos abatement projects that are beyond routine O&M procedures. Air-supplied self-contained, and "type C" airline respirators are the focus of the EPA/NIOSH document. These respirators allow workers to breathe fresh air supplied through hoses and face masks, and are generally used only by asbestos abatement workers engaged in large-scale asbestos removal projects. They are usually not considered either practical or necessary for most custodial and maintenance jobs.

An industrial hygienist or environmental/occupational health professional should assist workers with respirator selection and fitting, and train them in respirator use. Fit-testing (which means determining whether a particular brand and size of respirator properly fits an individual worker) is essential, since respirators which leak at the face seal provide significantly less protection. OSHA requires fit-testing initially and every six months for employees required to wear a negative pressure respirator for protection against asbestos, or for individuals exposed at or above the OSHA-specified limits.

A respirator's effectiveness is also influenced by how it is handled, cleaned, and stored. Custodial and maintenance staff should clean their respirators after each use, and disinfect their respirators at the end of a day's use. This improves comfort, and also reduces the chances of skin irritation or infection. After cleaning the respirator, custodial and maintenance staff should place the respirator (with the worker's name) in a clean and sanitary location and store the unit in a secure place for future use. Respirators should be visually inspected by the user before and after each use, during cleaning and at least monthly when not in use. Inspection records should be maintained accordingly When the respirator's high-efficiency filters are discarded, they should be disposed of as asbestos waste.

APPENDIX F

Existing EPA Guidance for Each Step That a Building Owner May Take to Conrol ACM

Action	Existing EPA Guidance/Regulations*
Appoint Asbestos Program Manager and Develop an Organizational Policy.	"Guidance for Controlling Asbestos-Containing Materials in Buildings" ("Purple Book") EPA publication number: 560/5-85-024
Inspect the facility to determine if ACM is present. Take bulk samples of suspect ACM and assess the material's condition.	"Guidance for Controlling Asbestos-Containing Materials in Buildings" ("Purple Book", chapter 2) EPA publication number 560/5-85-024 "Simplified Sampling Scheme for Surfacing Materials" ("Pink Book") EPA publication number: 560/5-85-030a "Asbestos-Containing Materials in Schools; Final Rule and Notice" (Asbestos Hazard Emergency Response Act, or AHERA). *Federal Register*– October 30, 1987. (sections 763.85 to 763.88) Model training course materials for accrediting asbestos building inspectors in accordance with AHERA (inspection/assessment materials).
Establish an O&M program.	"Purple Book, Chapter 3 AHERA regulations, sections 763.91 and 763.92 EPA Guidance for Service and Maintenance Personnel. EPA publication number 560/5-85-018
Implement and Conscientiously Manage the O&M Program; Assess the Potential for Exposure to Asbestos and Select Response Actions.	"Purple Book", Chapter 4 Model training course materials for accrediting asbestos management planners in accordance with AHERA (assessment materials). AHERA regulations, section 763.88 and 793.92
Select and Implement Abatement Actions Other Than O&M When Necessary	"Purple Book", Chapter 6 AHERA regulations, section 763.93 (including 763.85 through 763.92) AHERA regulation, appendix A Determining Completion of Response Actions-Methods. "Abatement of Asbestos-Containing Pipe Insulation" U.S. EPA Asbestos-ii-Buildings Technical Bulletin 1986-2. U.S. EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) Regulations (40 CFR 61) Model training course materials for accrediting asbestos management planners in accordance with AHERA (assessment materials).

*Most of these guidance materials are available through EPA's TSCA Assistance Hotline, at (202) 554-1404.

APPENDIX G:

- Cement Pipes
- Cement Wallboard
- Cement Siding
- Asphalt Floor Tile
- Vinyl Floor Tile
- Vinyl Sheet Flooring
- Flooring Backing
- Construction Mastics (floor tile, carpet, ceiling tile, etc.)
- Acoustical Plaster
- Decorative Plaster
- Textured Paints/Coatings
- Ceiling Tiles and Lay-in Panels
- Spray-Applied Insulation
- Blown-in Insulation
- Fireproofing Materials
- Taping Compounds (thermal)
- Packing Materials (for wall/floor penetrations)
- High Temperature Gaskets
- Laboratory Hoods/Table Tops
- Laboratory Gloves
- Fire Blankets
- Fire Curtains
- Elevator Equipment Panels
- Elevator Brake Shoes
- HVAC Duct Insulation
- Boiler Insulation
- Breeching Insulation
- Ductwork Flexible Fabric Connections
- Cooling Towers
- Pipe Insulation (corrugated air-cell, block, etc.)
- Heating and Electrical Ducts
- Electrical Panel Partitions
- Electrical Cloth
- Electric Wiring Insulation
- Chalkboards
- Roofing Shingles
- Roofing Felt
- Base Flashing
- Thermal Paper Products
- Fire Doors
- Caulking/Putties
- Adhesives
- Wallboard
- Joint Compounds
- Vinyl Wall Coverings
- Spackling Compounds

NOTE: This list does not include every product/material that may contain asbestos. It is intended as a general guide to show which types of materials may contain asbestos.

APPENDIX H:

USEPA. 1984. U.S. Environmental Protection Agency *National Emission Standards for Hazardous Air Pollutants.* 40 CFR 61. April 5, 1984.

USEPA. 1985. U.S. Environmental Protection Agency *Measuring airborne asbestos following an abatement action.* Washington DC: USEPA. EPA 600/4-85-049. ("Silver Book")

USEPA. 1985. U.S. Environmental Protection Agency *Asbestos in buildings: Simplified sampling scheme for surfacing materials.* Washington DC: USEPA. EPA 560/5-85-030A. ("Pink Book)

USEPA. 1985. U.S. Environmental Protection Agency *Guidance for controlling asbesdos-containing materials in buildings.* Washington DC EPA 560/5-85-024. ("Purple Book")

USEPA. 1985. U.S. Environmental Protection Agency *Asbestos in buildings: Guidance for service and maintenance personnel.* Washington DC: EPA 560/5-85-018. ("Custodial Pamphlet")

USEPA. 1986. U.S. Environmental Protection Agency *Abatement of asbestos-containing pipe insulation.* Washington DC: Technical Bulletin No. 1986-2.

USEPA. 1986. U.S. Environmental Protection Agency *A guide to respiratory protection for the asbestos abatement industry*. Washington DC: EPA 560/OPTS-86-00l.

USEPA. 1987. Asbestos *Abatement Projects; Worker Protection, Final Rule. 40* CFR 763. February 1987.

USEPA. 1987. U.S. Environmental Protection Agency *Asbestos-Containing Materials in Schools; Final Rule and Notice.* 40 CFR 763. *Federal Register,* October 30, 1987.

USEPA. 1988. *EPA Study of Asbestos-Containing Materials* in *Public Buildings: A Report to Congress.* February 1988.

USEPA. 1989. *Asbestos Ban and Phaseout Rule.* 40 CFR 763.160 to 763.179. *Federal Register* July 12, 1989.

USEPA. 1989. *Guidelines for Conducting the HERA TEM Clearance Test to Determine Completion of an Asbestos Abatement Project.* Washington DC: EPA 560/5-89-001.

USEPA. 1989. *Transmission Electron Microscopy Asbestos Laboratories: Quality Assurance Guidelines.* Washington DC: EPA 560/5-90-002.

U.S. Department of Labor: OSHA Regulations. 29 CFR 1910.1001 – *General Industry Asbestos Standard* and 29 CFR 1926.58 – *Construction Industry Asbestos Standard.* June 1986; Amended, September, 1988.

U.S. Department of Labor: OSHA Regulations. 29 CFR 1910.134 – *Respiratory Protection Standard.* June, 1974.

Keyes, Dale L. and Chesson, Jean. 1989. *A Guide to Monitoring Airborne Asbestos in Buildings.* Environmental Sciences, Inc., 105 E. Speedway Blvd., Tucson, Arizona 85705.

Chapter 15: Flooring Guidance

FLOORING GUIDANCE

Sections:

When is Removal of Vinyl Asbestos Tile a response Action under AHERA

Airborne Asbestos Concentrations During Buffing, Burnishing, and Stripping of Resilient Floor Tile, August 1995

OSHA Directive Regarding Asbestos Flooring Operations, November 3, 1995

OSHA Interpretation Regarding Asbestos Flooring Operations, May 18, 2005

EPA Interpretation Regarding Removal of Floor Mastic Using a Mechanical Buffer, December 05, 2005

HHCU Memo Regarding the EPA's Determination on Removal of Asbestos-Containing Floor Mastic Using a Mechanical Buffer, January 14, 2005

WHEN IS REMOVAL OF VINYL ASBESTOS TILE A RESPONSE ACTION UNDER AHERA

Question 42: **Is the removal of nonfriable asbestos containing Floor tile considered a response action that requires the use of accredited personnel? If more than 3,000 square feet is removed this summer, must TEM be used for clearance?**

Answer: If the floor tile or its adhesive material does not become friable during the removal process, it is not a response action, since the definition of response action refers to a method "that protects human health and the environment from friable ACBM." If the material becomes friable during removal, however, the job is then a response action requiring both accredited personnel and the use of TEM if the area exceeds 3,000 square feet. Typically, vinyl asbestos floor tile is tightly bound and asbestos is generally not released under normal use. However, during a removal operation, the tile could be rendered friable. In addition, any sanding operations conducted to remove the adhesive beneath the tiles would render the adhesive material friable.

Source:
100 Commonly Asked Questions About the New AHERA Asbestos-In-Schools Rule
Office of Toxic Substances, Office of Pesticides and Toxic Substances, U.S. Environmental Protection Agency, Washington, D.C. 20460, May 1988

Question: ***When removing vinyl asbestos floor tiles, do I need to use an AHERA accredited project designer and supervisor/workers?***

Aanswer: In July 1992, EPA published a policy clarification which described the circumstances under which the removal of vinyl asbestos tiles (VAT) would be considered a response action under AHERA therefore requiring accredited personnel for the removal. EPA has determined that removal of VAT (or other known or assumed asbestos-containing material flooring or its adhesive) which involves sanding, grinding, mechanical chipping, drilling, cutting or abrading the material has a high probability of rendering the material friable and capable of releasing asbestos fibers. Therefore, removal projects which employ any of these techniques (other than small-scale short duration) must be conducted as response actions. This would require use of a project design, accredited persons and air clearance.

Source:
AHERA Frequently Asked Questions
http://yosemite.epa.gov/r10/owcm.nsf/d14dabb756dc1fb3882565000062f164/bbc2e1ebc786885a8825681700722d83!OpenDocument

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUL 15 1992

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: AHERA Policy Clarification on Vinyl Asbestos Tile (VAT)

FROM: John Jn. Nneylan InII, Director
Policy and Grants Division
Office of Compliance Monitoring

TO:n ADDRESSEES

Enclosed are copies of the final policy clarification on VAT removal under AHERA. As you know, this clarification is a product of the AHERA Interpretive Guidance Workgroup which is chaired by the Office of Compliance Monitoring and made up of representatives from the Office of General Counsel, Office of Enforcement, Office of Pollution Prevention and Toxics, Region I, and the Office of Air Quality Planning and Standards. It has also received the review and concurrence of the Regional offices and OPPT.

Thank you to all who participated in the development of this clarification through your review and comment. Special recognition for many hours of hard work is due to the members ofn the VAT Removal Subgroup: Mary Jane Angelo, OGC; Tom Ripp, OAQPS; Bob Jordan, EAD; Sally Sasnett, OCM; and especially to the Subgroup Chair, Betsy Dutrow, of the Exposure Evaluation Division (OPPT); and to Jim Bryson, Region I for coordinating Regional responses.

We have enclosed 50 copies for use by each Region and plan to make copies of this document available for distribution through the TSCA Hotline. We are in the process of getting additional copies printed. Please let us know if additional copies are needed for your Region.

Again thank you for your continuing assistance with the AHERA Interpretive Guidance process. If you have any questions please contact Sally Sasnett, Workgroup Chair, or Jim Bryson, Regional Coordinator.

Enclosuren

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Prevention, Pesticides and Toxic Substances
AHERA Interpretive Guidance Workgroup
Office of Compliance Monitoring
July 1992

POLICY CLARIFICATIONt FOR THE ASBESTOS HAZARD EMERGENCY RESPONSE ACT (AHERA)

ISSUE: Under what circumstances is removaltof VinyltAsbestos Tile (VAT) similar materials a response action nder AHERA?

BACKGROUND:

AHERA section 202, Definitions, states that a response action " ... meanst methods that protect human health and the environment from asbestos-containing t material."

The AHERA schools regulation definition of response action (40 CFR 763.83) states: "Response action means a method, including removal, encapsulation, enclosure, repair, operations and maintenance, that protects human health and the environment from friable ACBM."

In defining "friable", the AHERA schools rule states: "'Friable' when referring to material in a school building means that the material, when dry, may be crumbled,t pulverized, or reduced to powder by hand pressure, and includes previous nonfriable t material after such previously nonfriable material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure."t

The response to Question 42 of the "100 Commonly Asked Questions About the AHERA Asbestos-In-Schools Rule" (May 1988) also relates to the issue. It states:t

> "If the floor tile or its adhesive material does not become friable during the removal process, it is not a response action, since the definition of response actiont refers to a method "that protects human health and the environment from friablet ACBM." If the material becomes friable during removal, however, the job is then a response action ..."

Implicit in this answer is the assumption that if the material is already friable, thet activity must be conducted as a response action.

This paper seeks to clarify that certain VAT removal activities must be conductedt as response actions under AHERA and that the determination of whether a particular removal activity is, or is not, a response action, needs to occur prior to initiation of thet activity in order that all necessary requirements and precautions are met.t

DISCUSSION:

Vinyl asbestos tile (or sheet flooring) in good condition would generally be considered nonfriable. However, it is recognized that when nonfriable ACM is subjected to certain forces, such as mechanical forces, weather, or aging, it can be weakened to the pointowhere it can become friable (i.e., crumbled, pulverized, or reduced to powder by hand pressure) and can thereby release asbestos fibers. EPA discussed this situation in the preamble to the November 20, 1990 Asbestos NESHAP Revision and acknowledged

The AHERA schools rule also recognized the potential for nonfriable material to become friable in both its definition of friability and in 40 CFR 763.91(a): "Any materialo identified as nonfriable ACBM or nonfriable assumed ACBM must be treated as friable ACBM for purposes of this section when the material is about to become friable as a result of activities performed in the school building."

o The use of certain mechanical techniques on VAT or asbestos-containing sheet

flooring (and the mastic used to hold it in place), such as sanding, grinding, chipping, drilling, cutting,band abrading, create a high probability that ACM will be damaged oro weakened to such an extent that it would be rendered friable. Based on the AHERAo regulation's definition of response action as "a method that protects human health ando the environment from friable ACBM", and the expectation that the material will beo rendered friable by the activity, if any of these methods are employed to remove VATo from an AHERA-regulated school building, the activity would be considered to be ao response action (unless it is a small-scale-short-duration project). In addition, theo asbestos NESHAP requirements, including notification, may apply to the activity.o

[1] Category I nonfriable ACM is any asbestos-containing packing, resilient flooro covering (and mastic), or asphalt roofing product which contains more than 1 percent asbestos as determined using polarized light microscopy (PLM). Category II nonfriable ACM is any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos as determined using PLM, that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure. (40 CFR Part 61 Subpart M, Sec. 61.141)

[2] In this context, "cutting" does not include shearing, slicing, or punching.

However, at this time, it appears that certain other removal techniques which doe not use grinding, mechanical chipping, abrading, cutting, sanding, or drilling the material would not be expected to render the material friable. (Examples of such techniquese include those which use solvents, water, or heat -- such as infra-red, or other similar techniques, which cause the tiles to become loosened or pliant to the point where theye are easily removed.) These activities would not be considered to be response actions, as long as the material is not already friable, or in such poor condition that it is likely toe become friable during the activity, or as a consequence of the activity.

In summary, in deciding whether or not to conduct a removal activity (other thane small-scale-short-duration) as a response action (including use of a project design, accredited persons, and air clearance), both of the following factors must be considered.e

1) Condition of the material. If the material is in such poor condition that it ise already friable, or that it is likely to become friable during, or as a consequence ofe the activity, the removal must be conducted as a response action, because of the high probability of fiber release from the friable material.e

2)eThe methods which will be used to remove the material, (including the mastic).e If the removal methods involve sanding, grinding, drilling, mechanical chipping, e cutting[3], or abrading the material, or any other technique that is likely to result ine rendering the material friable, the removal must be conducted as a responsee action.e

In addition to fulfilling AHERA requirements, consideration of these factors ise consistent with the requirements of the Asbestos NESHAP.

DETERMINATION:

Removal of VAT (or other known or assumed ACM flooring or its adhesive) which involves sanding, grinding, mechanical chipping, drilling, cutting[4], or abrading thee material has a high probability of rendering the material friable and capable of releasing asbestos fibers. Therefore, removal projects which employ any of these techniques (othere than small-scale-short-duration) must be conducted as response actions, including use of a project design, accredited persons, and air clearance.e

In addition, any removal project should receive careful planning prior to initiatione in order to determine whether it needs to be conducted as a response action. While this paper is directed primarily at clarifying which removal activities must be conducted ase response actions, removal techniques for small-scale-short-duration projects should alsoe be evaluated prior to intitiation to ensure that they, too, are conducted safely.

[3] See footnote #2.

[4] See footnote #2.e

No matter what the removal technique or scope of the project, consideration should be given to worker and building occupant protection (including OSHA and EPA Worker Protection requirements and state regulations), proper disposal of removed material, and final cleaning of the work area. Thought should also be given to the potential for releases of VOCs (volatile organic compounds) from solvents; fire hazards; and possible hazardous waste considerations from the use of solvents such as toluene and xylene to remove mastic. In addition, NESHAP requirements apply to any project, or group of projects at a facility, planned or anticipated within a calendar year which will reach the NESHAP threshold (160 square or 260 linear feet).

ADDRESSEES

Mark Greenwood (TS-792)
Michael Walkero (LE-134P)
James C. Nelson (LE-132P)
Michael M. Stahl (EN-342)
Connie Musgroveo "
John J. Neylan III "
Mike Wood "
Janet Bearden "
Maureen Lydon "
Jerry Stubbs "
Linda Flick "

Jake Mackenzie
Western Regional Compliance Director

I Linda M. Murphy, Acting Director
Air, Pest. & Toxics Mangt. Div.

Marvin Rosenstein, Chief
Pesticides & Toxic Substances

II Barbara Metzger, Director
Environmental Services Division

Ernest Regna, Chief
Pesticides & Toxic Substances

Thomas J. Maslany, Director o
Air, Toxics and Radiationo
Management Division

Jim Burke, Chief

Winston A. Smith, Directoro
Air, Pest. & Toxics Mangt. Divo

Jewell A. Harper, Chief
Air Enforcement Branch

IV William H. Sanders III, Directoro
Environmental Sciences Divisiono

Phyllis Reed, Chief
Pesticides & Toxic Substances

Stanley Meiburg, Directoro
Air, Pesticides & Toxic Divisiono

Robert Murphy, Chief
Pesticides & Toxic Substances

William A. Spratlin, Directoro
Air and Toxics Divisiono

Leo Alderman, Chief
oPesticides & Toxic Substanceso

Patricia Hull, Directoro
Air, Radiation & Toxics Divisiono

C. Alvin Yorke, Chief
Toxic Substances Brancho

David P. Howekamp, Directoro
Air Management Divisiono

Davis Bernstein, Chief
Pesticides & Toxics Branch

Jim McCormick, Directoro
oAir and Toxics Divisiono

Kenneth Feigner, Chief
Pesticides & Toxic Substances

cc: Regional Asbestos Coordinatorso
Richard Biondi (EN-341)
OPPT Division Directorso
Bob McNally OPPT/EAD
Joe Breen OPPT/EED
Gina Bushong OPPT/EADo
Greg Roscoe, Region Io

AHERA Int. Guidance Workgroup

United States
Environmental Protection
Agency

National Risk Management
Research Laboratory
Cincinnati, OH 45268

Research and Development

EPA/600/SR-95/121 August 1995

EPA

Project Summary

Airborne Asbestos Concentrations During Buffing, Burnishing, and Stripping of Resilient Floor Tile

John R. Kominsky, Ronald W. Freyberg, and James M. Boiano

This study was conducted to evaluate airborne asbestos concentrations during low-speed spray-buffing, ultra high-speed burnishing, and wet-stripping of asbestos-containing resilient floor tile under pre-existing and prepared levels of floor care maintenance. Airborne asbestos concentrations were measured before and during each floor-care procedure to determine the magnitude of the increase in airborne asbestos levels during each procedure. Airborne total fiber concentrations were also measured for comparison with the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) of 0.1 f/cm^3, 8-hr. time-weighted average (TWA). Low-speed spray-buffing and wet-stripping were evaluated on pre-existing floor conditions and three levels of prepared floor-care conditions (poor, medium, and good). Ultra high-speed burnishing and wet-stripping were evaluated on two levels of prepared floor-care conditions (poor and good). All of the computed 8-hr. TWA personal sample results were below the OSHA PEL. It is noted that the floor tile in this study was of low asbestos content and in good condition, hence it is conceivable that floor tile with higher percentages of asbestos could result in higher levels of airborne asbestos during routine floor care maintenance activities. TEM analysis showed higher exposures to fibers predominantly less than 5 µm in length, whereas these shorter fibers were not counted by PCM.

This study shows that low-speed spray-buffing, ultra high-speed burnishing, and wet-stripping of asbestos-containing resilient floor tile can be sources of airborne asbestos in building air. The results suggest that multiple layers of sealant applied to the floor prior to the application of the floor finish can reduce the release of asbestos fibers during polish removal. The results of this study further support the U.S. EPA Recommended Interim Guidance for Maintenance of Asbestos-Containing Floor Coverings.

This Project Summary was developed by EPA's National Risk Management Research Laboratory, Cincinnati, OH, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

Three principal types of preventive maintenance are routinely performed on resilient floor tile: spray-buffing, ultra high-speed burnishing, and wet-stripping followed by refinishing. Spray-buffing is the restorative maintenance of a previously polished floor by use of a floor-polishing machine (operating at 175 to 1000 rpm) immediately after the surface has been mist-sprayed with a restorative product whereby the floor is buffed to dryness. Ultra high-speed burnishing is the buffing of a previously polished floor by using a floor polishing machine (operating at greater than 1500 rpm) without using a

restorative spray product. Wet-stripping is the removal of the finish from the floor using a chemical floor-polish stripper and a 175 rpm floor machine equipped with an appropriate strip pad. This current study was conducted to evaluate airborne asbestos concentrations during low-speed spray-buffing, ultra high-speed burnishing, and wet-stripping of asbestos-containing resilient floor tile under pre-existing and prepared levels of floor care maintenance.

Objectives

The objectives of the study were as follows:

- To determine the airborne asbestos concentrations during low-speed spray-buffing of asbestos-containing resilient floor tile in pre-existing floor condition.
- To determine airborne asbestos concentrations during polish removal from asbestos-containing resilient floor tile in pre-existing floor condition.
- To determine and compare the airborne asbestos concentrations during low-speed spray-buffing of asbestos-containing resilient floor tile in poor, medium, and good floor conditions.
- To determine and compare airborne asbestos concentrations during polish removal after low-speed spray-buffing of asbestos-containing resilient floor tile in medium and good conditions using a manual floor machine.
- To determine and compare the airborne asbestos concentrations during ultra high-speed burnishing of asbestos-containing resilient floor tile in poor and good floor conditions.
- To determine and compare the airborne asbestos concentrations during polish removal after ultra high-speed burnishing of asbestos-containing resilient floor tile in poor and good floor conditions using an automated floor machine.
- To determine whether personal breathing zone concentrations during low-speed spray-buffing of floors in pre-existing, poor, medium, and good conditions exceed the OSHA Permissible Exposure Limit (PEL) of 0.1 f/cm^3, 8-hr. Time-Weighted Average (TWA).
- To determine whether personal breathing zone concentrations during ultra high-speed burnishing of floors in poor and good conditions exceed the OSHA PEL of 0.1 f/cm^3, 8-hr. TWA.
- To determine whether personal breathing zone concentrations during polish removal after low-speed spray-buffing of floors in pre-existing, poor, medium, and good condition exceed the OSHA PEL of 0.1 f/cm^3, 8-hr. TWA.
- To determine whether personal breathing zone concentrations during polish removal after ultra high-speed burnishing of floors in poor and good conditions exceed the OSHA PEL of 0.1 f/cm^3, 8-hr. TWA.

Site Description

This study was conducted in an unoccupied building located at the decommissioned Chanute Air Force Base (AFB) in Rantoul, IL. The study was conducted in a room which contained approximately 8600 ft^2 of open floor space tiled with 9-inch by 9-in. resilient floor tile containing approximately 5% chrysotile asbestos. Representatives of the Chemical Specialties Manufacturers Association (CSMA) and a floor products manufacturer visually inspected the physical condition of the floor. Their inspection focused on the evenness of the floor plane and the physical condition of the tile. They concluded that the floor was acceptable for the proposed study.

Configuration for Low-speed Spray-buffing and Wet-stripping Experiments

Approximately 6500 ft^2 of floor space was isolated as the experimental test area. A containment shell was constructed from 2-in. by 4-in. and 2-in. by 6-in. lumber to provide five equally-dimensioned test rooms, each with approximately 1300 ft^2 of floor space and 7-ft ceiling height. The containment shell was then surfaced with 6-mil polyethylene sheeting to provide airtight walls and ceilings for the five test rooms. The ceiling for each test room consisted of a single layer of polyethylene sheeting. The walls of each test room were surfaced with seven layers of polyethylene sheeting. Four high-efficiency particulate air (HEPA) filtration units were placed in the hallway outside of the five test rooms to ventilate the test rooms and reduce the airborne asbestos concentrations to background levels after each experiment.

Configuration for Ultra High-Speed Burnishing and Wet-Stripping Experiments

Upon completion of the low-speed spray-buffing and wet-stripping experiments, the test area was reconfigured to accommodate the ultra high-speed burnishing and wet-stripping experiments. The test area was reconfigured to provide a single test room of approximately 6500 ft^2 of floor space and 7-ft. ceiling height. The ceiling for the test room consisted of a single layer of polyethylene sheeting. The walls were surfaced with eight layers of polyethylene sheeting. Three HEPA filtration units were placed in the hallway outside of the test room to ventilate the test room and reduce the airborne asbestos concentrations to background levels after each experiment. The units were operated during the preparation phase of each experiment but not during the actual burnishing or wet-stripping experiments. All three HEPA units discharged the air outdoors via 12-in. diameter flexible ducting. Fresh air into the test room was obtained directly from outdoors through windows.

Experimental Design

Low-Speed Spray-Buffing and Wet-Stripping

Pre-existing Conditions

Low-speed spray-buffing was first evaluated on the pre-existing floor-care condition. Pre-existing condition was the condition of the floor as it existed in the room prior to evaluating the prepared floor-care conditions. Pre-existing floor conditions consisted of an undetermined number of coats of a Carnauba-type, buffable polish on the floor tile. Low-speed spray-buffing of the pre-existing floor-care condition was evaluated five times, once in each of the five test rooms. Wet-stripping (including polish and sealant removal) was also evaluated on the pre-existing floor-care condition. Wet-stripping of the pre-existing floor-care condition was evaluated five times, once in each of the five test rooms.

Prepared Floor Care Conditions

Low-speed spray-buffing was evaluated on three levels of prepared floor-care conditions: 1) poor floor-care condition, 2) medium floor-care condition, and 3) good floor-care condition. Poor floor-care condition was defined as a floor with one coat of sealant and one coat of polish. Medium floor-care condition was defined as a floor with one coat of sealant and two coats of polish. Good floor-care condition was defined as a floor with two coats of sealant and three coats of polish. Floor-care conditions were defined in consultation with the CSMA and other representatives of floor-care products manufacturers. Each floor-care condition was evaluated five times, once in each of the five test rooms, to yield a total of 15 experiments.

Wet-stripping after low-speed spray-buffing was evaluated on two levels of floor-

care conditions (medium and good). This comparison addresses the effectiveness of two coats of sealant versus one coat of sealant to limit the extent of airborne asbestos concentrations during polish removal. Wet-stripping of each of the two floor-care conditions were evaluated five times, once in each of the five test rooms, to yield a total of 10 experiments.

Ultra High-Speed Burnishing and Wet-Stripping

Ultra high-speed burnishing was evaluated on two levels of prepared floor-care conditions: 1) poor floor-care condition, and 2) good floor-care condition. Poor floor-care condition was defined as a floor with two coats of sealant and one coat of polish. Good floor-care condition was defined as a floor with two coats of sealant and four coats of polish. Floor-care conditions were defined in consultation with the CSMA and other representatives of floor-care chemicals manufacturers. Each floor-care condition was evaluated four times to yield a total of eight experiments.

Wet-stripping after ultra high-speed burnishing were also evaluated on two levels of floor-care condition (poor and good). Each of the two floor-care conditions were evaluated four times to yield a total of eight experiments.

The CSMA and other representatives from the floor-care chemicals industry specified different definitions of poor and good floor-care conditions for the low-speed and ultra high-speed experiments based on the varying nature of the two floor-care procedures. Although this precluded a direct comparison of the results from the low-speed and ultra high-speed experiments, the different definitions of floor-care condition were necessary to conduct a practical evaluation of each floor-care procedure.

Sampling Strategy

Area air samples were collected before each experiment to establish a baseline airborne asbestos concentration in the test room for comparison with the concentration measured during low-speed spray-buffing, ultra high-speed burnishing or wet-stripping. After the baseline samples were started, the floor of the test room was thoroughly swept with the exhaust of a 1-hp leaf blower. Five baseline area air samples were collected in each test room/area before each experiment. One sample was located in each quadrant of the test room; the fifth sample was located in the center of the test room. Two field blanks (one open and one closed) were also collected during the baseline sampling as a control for filter contamination.

Three personal breathing zone samples were collected on the equipment operator during each experiment for comparison with the baseline samples. Two additional personal samples were also collected on the operator for comparison to the OSHA PEL of 0.1 f/cm^3, 8-hr TWA. Three field blanks (one open and one closed 0.45 µm mixed cellulose ester (MCE), one open 0.8 µm MCE) were also collected during each experiment as a control for filter contamination.

Sampling Methods

The area air samples (baseline and outdoor) were collected on open-face, 25-mm diameter, 0.45-µm pore-size, MCE filters with a 5-µm pore-size cellulose support pad contained in a three-piece cassette. The filter cassettes were positioned approximately 5 ft above the floor with the face of the filter at a 45° angle toward the floor. The filter assembly was attached to an electric-powered (110 VAC) 1/6-hp vacuum pump operating at a flowrate of approximately 9 l/min.

Five personal breathing zone air samples were collected during each experiment on the individual operating the floor machine. Two samples were collected on open-face, 25-mm diameter, 0.8-µm poresize MCE membrane filters and cellulose support pad contained in a three-piece cassette with a 50-mm conductive extension cowl. These two samples were analyzed by phase contrast microscopy (PCM). Three additional personal breathing zone samples were collected on an open-faced, 25-mm-diameter, 0.45 µm pore-size MCE filters with a 5 µm poresize MCE diffusing filter and a cellulose support pad contained in a 3-piece cassette. These three samples were analyzed by transmission electron microscopy (TEM).

Analytical Methods

Baseline Samples

The MCE filters were prepared and analyzed in accordance with the nonmandatory TEM method specified in the AHERA Final Rule (October 30, 1987; 52 CFR 4826). In addition to the requirements of the AHERA nonmandatory TEM method, the specific length and width of each structure were measured and recorded. A sufficient number of grid openings were analyzed to ensure a sensitivity (the concentration represented by the finding of a single structure) of no greater than 0.005 asbestos structures per cubic centimeter of air sampled, unless the degree of loading made this impractical. On heavily loaded samples, counting stopped after completing the grid square in which the 100th asbestos structure was found.

Personal Breathing Zone Samples

The two 0.8-µm pore-size MCE filters used to collect the personal breathing zone samples were analyzed by PCM. These samples were prepared and analyzed according to NIOSH Method 7400 (Revision 3, June 5, 1989, National Institute for Occupational Safety and Health Manual of Analytical Methods). The analytical sensitivity was approximately 0.01 fibers/cm^3 of air sampled. The three personal breathing zone samples collected on 0.45 µm poresize MCE filters were analyzed by TEM as described above for the baseline samples.

Statistical Methods

The relative change in airborne asbestos concentration was measured by the ratio of the average concentration during the specific maintenance procedure to the average concentration before the maintenance procedure. These ratios were then compared by taking the natural logarithm and comparing the averages by standard analysis of variance (ANOVA) techniques.

Quality Assurance

During the study, sample chain-of-custody procedures were an integral part of both the sampling and analytical activities and were followed for all air and bulk samples collected. The field custody procedures documented each sample from the time of its collection until its receipt by the analytical laboratory. Internal laboratory records then documented the custody of the sample through its final disposition. Specific quality assurance procedures outlined in the AHERA rule were used to ensure the precision of the collection and analysis of air samples, including filter lot blanks, open and closed field blanks, and repeated sample analyses.

Results and Discussion

Low-Speed Spray-Buffing and Wet-Stripping Experiments

Pre-existing Floor Conditions

TEM Concentrations

Low-speed spray-buffing and wet-stripping were first evaluated on the pre-existing floor-care condition. Pre-existing condition was the condition of the floor as it existed in the room prior to evaluating the prepared floor care conditions.

Results of the one-factor ANOVA indicate that the specific maintenance proce-

dure had a statistically significant effect on airborne asbestos concentrations measured during the procedure (p=0.0128). Specifically, larger increases in airborne asbestos concentrations were observed during wet-stripping than during spray-buffing. The estimated airborne asbestos concentrations during spray-buffing and wet-stripping as a proportion of the respective baseline concentrations were calculated along with the corresponding 95% confidence interval. The average airborne asbestos concentration measured during low-speed spray-buffing was approximately 11 times greater than the average baseline concentration. The 95% confidence interval for this proportion is (2.6, 47). The lower 95% confidence limit is greater than 1, which indicates this is a statistically significant increase. The average airborne asbestos concentration measured during wet-stripping was approximately 186 times greater than baseline concentrations. The 95% confidence interval for this proportion is (44, 788). The lower 95% confidence limit is greater than 1, which indicates this is a statistically significant increase.

PCM Concentrations

Two personal breathing zone samples were collected during each experiment and analyzed by PCM. None of the individual PCM concentrations exceeded the OSHA PEL of 0.1 f/cm^3. The highest individual PCM concentration (0.023 f/cm^3) was measured during wet-stripping. The 8-hr TWA concentrations associated with the measured levels were calculated by assuming zero exposure beyond that which was measured during the experiment. The 8-hr TWA concentrations ranged from 0.001 to 0.003 f/cm^3 during low-speed spray-buffing and from 0.0003 to 0.003 f/cm^3 during wet-stripping of floors in pre-existing condition. None of the 8-hr TWA concentrations exceeded the OSHA PEL of 0.1 f/cm^3.

Although the results of the personal breathing zone samples analyzed by PCM were all below the OSHA PEL, considerably higher exposures were shown by the personal breathing zone samples analyzed by TEM. Two primary reasons explain why the TEM concentrations were considerably higher than the PCM concentrations. First, PCM cannot detect fibers thinner than 0.25 µm in width. Second, the PCM method used in this study (i.e., NIOSH 7400) does not count fibers shorter than 5 µm in length. Over 99% of the asbestos structures measured during low-speed spray-buffing and wet-stripping of floors in pre-existing condition were shorter than 5 µm in length and would therefore not be counted by the PCM method.

Caution should be exercised in extrapolating the PCM measurements collected during this study to conditions at other sites. These tile were of low asbestos content and in good condition, and no other asbestos exposure activity was assumed.

Prepared Floor Conditions

TEM Concentrations

Figure 1 illustrates the overall average (geometric mean) concentrations measured before and during low-speed spray-buffing and wet-stripping on floors in prepared floor conditions. Although the mean relative increase in airborne asbestos concentrations during low-speed spray-buffing tended to decrease as the floor care condition improved (i.e., poor condition resulted in a larger relative increase than medium, and medium condition showed a larger relative increase than good), the differences between the three levels of floor care were not statistically significant (p=0.1149). Overall, the average airborne asbestos concentration during low-speed spray-buffing was approximately 2.6 times higher than the average baseline concentration. This increase was statistically significant (p=0.0017). A 95% confidence interval for the mean airborne asbestos concentration during spray-buffing as a proportion of the baseline concentration showed that the overall mean airborne asbestos con-

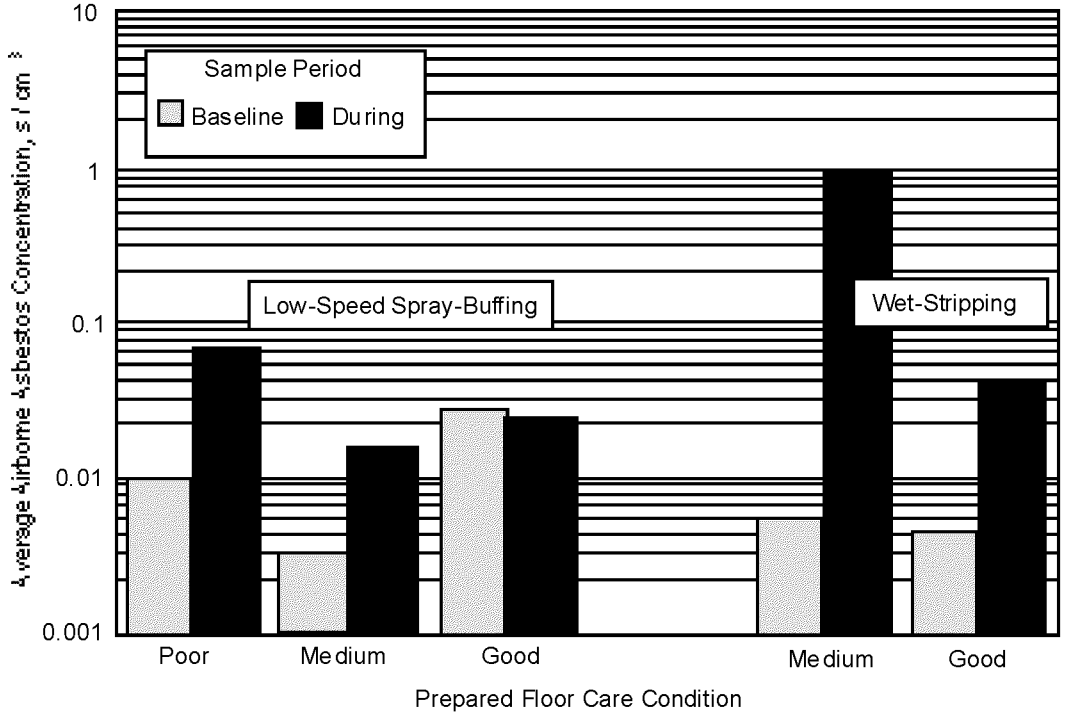


Figure 1. *Average airborne asbestos concentrations during low-speed spraying of floors in prepared conditions.*

centration was between 1.3 and 5 times greater during buffing than before buffing.

Significantly larger increases in airborne asbestos concentrations were observed during wet-stripping of floors in medium condition than on floors in good condition (p=0.0029). The relative increase in airborne asbestos concentrations (i.e., compared to baseline measurements) was approximately 14 times greater, on average, during wet-stripping of floors in medium condition than during wet-stripping of floors in good condition.

The estimated airborne asbestos concentrations during wet stripping of floors in medium and good condition as a proportion of the respective baseline concentrations were calculated along with the corresponding 95% confidence interval. The average airborne asbestos concentration measured during wet-stripping of floors in medium condition was approximately 108 times greater than the average baseline concentration. The 95% confidence interval for this proportion is (33, 335). The lower 95% confidence limit is greater than 1, which indicates this is a statistically significant increase. The average airborne asbestos concentration measured during wet-stripping of floors in good condition was approximately 8 times greater than the average baseline concentration. The 95% confidence interval for this proportion is (2.5, 25). The lower 95% confidence limit for this proportion is greater than 1, which indicates this is a statistically significant increase. The stripping solution used on these floors was designed to remove only the polish from the floor, leaving the layer(s) of sealant on the floor. Therefore, although significant increases in airborne asbestos concentrations were observed during wet-stripping of floors in both medium and good condition, the extra layer of sealant on floors in good condition appears to significantly decrease the airborne asbestos levels.

Overall, significantly larger increases (p=0.0001) in airborne asbestos concentrations were observed during wet-stripping than during low-speed spray-buffing (this comparison was restricted to floors in medium and good condition since wet-stripping was not evaluated on floors in poor condition). The relative increase in airborne asbestos concentrations was approximately 18 times greater, on average, during wet-stripping than during low-speed spray-buffing.

PCM Concentrations

Two personal breathing zone samples were collected during each experiment and analyzed by PCM. None of the individual PCM concentrations exceeded the OSHA PEL of 0.1 f/cm^3. The highest individual PCM concentration (0.032 f/cm^3) was measured during low-speed spray-buffing. The 8-hr TWA concentrations associated with the measured levels were calculated by assuming zero exposure beyond that which was measured during the experiment. The 8-hr TWA concentrations ranged from 0.0003 to 0.006 f/cm^3 during low-speed spray-buffing and from 0.0003 to 0.002 f/cm^3 during wet-stripping. None of the 8-hr TWA concentrations exceeded the OSHA PEL of 0.1 f/cm^3. It is noted, however, that these tile were of low asbestos content and in good condition, and that no other asbestos exposure activity was assumed. TEM analysis showed higher exposures to structures predominantly less than 5 µm in length. Over 99% of the asbestos structures measured during low-speed spray-buffing and wet-stripping of floors in pre-existing condition were shorter than 5 µm in length and would not be counted by the PCM method. Therefore, caution should be exercised in extrapolating the PCM measurements collected during this study to conditions at other sites.

Ultra High-Speed Burnishing and Wet-Stripping Experiments

TEM Concentrations

Figure 2 illustrates the average airborne asbestos concentrations measured before and during high-speed burnishing and stripping. Results of the two-factor ANOVA indicate that neither the maintenance procedure (p=0.2491) nor the floor condition (p=0.7396) had a statistically significant effect on the relative increase in airborne asbestos concentrations measured during the maintenance procedure. That is, similar increases in airborne asbestos concentrations were seen during ultra high-speed burnishing and wet-stripping of floors in both poor and good condition. No floor condition or maintenance procedure resulted in significantly higher or lower increases in mean airborne asbestos concentration.

The estimated airborne asbestos concentrations during ultra high-speed burnishing and wet-stripping as proportions of the respective baseline concentrations were calculated along with the corresponding 95% confidence interval. When averaged over floor care condition (good, poor), the mean airborne asbestos concentration during ultra high-speed burnishing was approximately 14 times greater than the mean baseline concentration. The 95% confidence interval for this proportion is (7.6, 26). The lower confidence limit is greater than 1, which indicates this is a statistically significant increase. Similarly, when averaged over floor care condition, the mean airborne asbestos concentration during wet-stripping was approximately 9 times greater than the mean baseline concentration. This increase is also statistically significant.

The estimated airborne asbestos concentrations during procedures on floors in poor and in good condition as proportions of the respective baseline concentrations were calculated along with the corresponding 95% confidence interval. When averaged over floor care procedure (ultra high-speed burnishing, wet-stripping), the mean airborne asbestos concentration during procedures on floors in poor condition was approximately 12 times greater than the mean baseline concentration. The 95% confidence interval for this proportion is (6.4, 22). The lower confidence limit is greater than 1, which indicates this is a statistically significant increase. Similarly, when averaged over floor care procedure, the mean airborne asbestos concentration during procedures on floors in good condition was approximately 10 times greater than the mean baseline concentration. This increase is also statistically significant.

Overall, ultra high-speed burnishing and wet-stripping resulted in an 11-fold increase, on average, in airborne asbestos concentration. A 95% confidence interval for the overall average concentration during ultra high-speed burnishing and wet-stripping expressed as a proportion of the average baseline concentration is (7.1, 17.2). The lower confidence limit is greater than 1, which indicates the increase is statistically significant.

PCM Concentrations

The ultra high-speed burnishing operation produced a fine, pale yellow, powdery dust from the wax and/or sealant. PCM concentrations measured during ultra high-speed burnishing were significantly higher than those measured during stripping. The elevated concentrations measured during ultra high-speed burnishing were due primarily to the white dust generated during the process. The fine dust particles (pulverized wax/sealant) that measured greater than 5 µm in length and had a length-to-width aspect ratio of 3:1 were counted as fibers (NIOSH Method 7400, A Counting Rules). The corresponding TEM concentrations show that the PCM concentrations do not reflect an accurate indication of the airborne asbestos concentrations.

The 8-hr TWA concentrations were calculated by assuming zero exposure beyond that which was measured during the experiment. Although none of the 8-hr

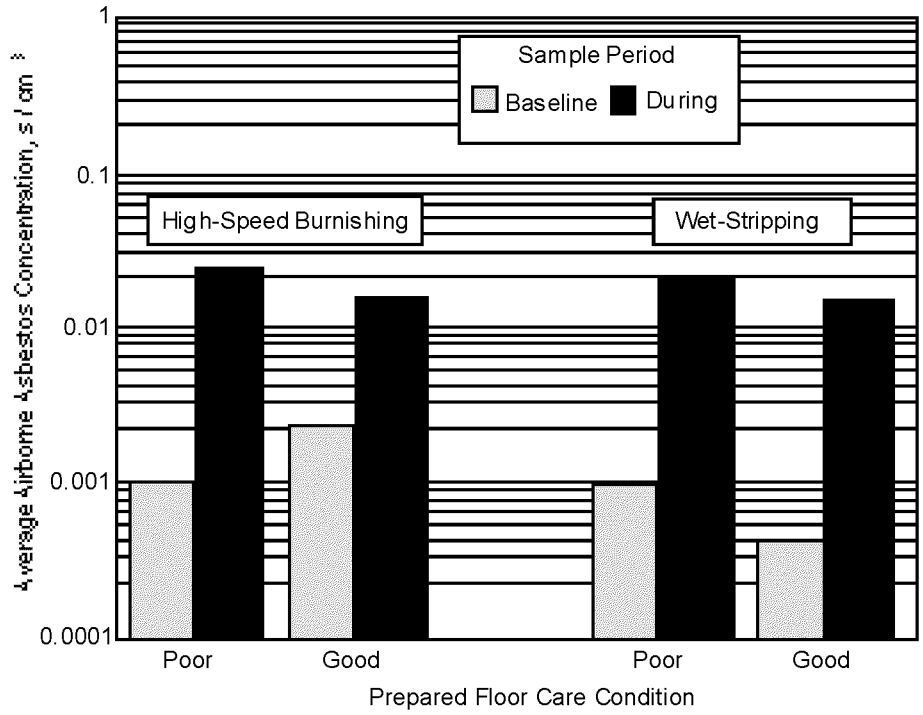


Figure 2. *Average airborne asbestos concentrations measured before and during ultra high-speed burnishing and wet-stripping of floors in prepared conditions.*

TWA concentrations measured during wet-stripping (after ultra high-speed burnishing) exceeded the OSHA PEL of 0.1 f/cm^3 for total fibers, all of the 8-hr TWA concentrations measured during ultra high-speed burnishing exceeded the OSHA PEL. These exceedances, however, were due to the excess nonasbestos-containing particulate generated during the burnishing process and not to elevated airborne asbestos particles.

Conclusions

The following are the principal conclusions reached during this study:

1) Larger increases in airborne asbestos concentrations were observed during wet-stripping than during low-speed spray-buffing of floors in pre-existing condition. The average airborne asbestos concentration measured during low-speed spray-buffing was approximately 11 times greater than the average baseline concentration. The average airborne asbestos concentration measured during wet-stripping was approximately 186 times greater than the respective average baseline concentration. In both cases, the increases in airborne asbestos concentrations were statistically significant.

2) The average airborne asbestos concentration measured during low-speed spray-buffing of floors in the three levels of prepared floor-care conditions (poor, medium, and good) was approximately 2.6 times higher than the average baseline concentration. This increase was statistically significant.

3) The level of prepared floor care did not significantly affect the airborne asbestos concentrations measured during low-speed spray-buffing. Although the average increase in airborne asbestos concentrations tended to decrease as the level of floor care improved, the differences due to the three levels of floor care were not statistically significant.

4) Wet-stripping of floors in medium and good condition (after low-speed spray-buffing) resulted in statistically significant increases in airborne asbestos concentrations. The average airborne asbestos concentration measured during wet-stripping of floors in medium condition was approximately 108 times higher than the average baseline concentration, whereas the average airborne asbestos concentration measured during wet-stripping of floors in good condition was approximately 8.0 times higher than the average baseline concentration. The increase was statistically significant for both floor-care conditions.

5) A second layer of sealant appears to significantly decrease airborne asbestos levels during wet-stripping (after low-speed spray buffing). Larger increases in airborne asbestos concentrations were observed during wet-stripping of floors in medium condition than on floors in good condition. The average increase (relative to baseline measurements) in airborne asbestos concentration during wet-stripping of floors in medium condi-

tion was approximately 14 times greater than during wet-stripping of floors in good condition. This difference was statistically significant.

6) Overall, larger increases in airborne asbestos concentrations were observed during wet-stripping than during low-speed spray-buffing. The average increase (relative to baseline measurements) in airborne asbestos concentration during wet-stripping was approximately 18 times greater than during low-speed spray-buffing. This difference was statistically significant.

7) None of the individual airborne total fiber concentrations (determined by PCM) measured during low-speed spray-buffing and wet-stripping of floors in pre-existing or prepared conditions exceeded the OSHA PEL of 0.1 f/cm^3. The 8-hr TWA concentrations, calculated by assuming zero exposure beyond that which was measured during the experiment, were also below the OSHA PEL. Although all of the computed 8-hr TWA personal sample results for the conditions of this study were below the OSHA PEL, it is noted that these tile were of low asbestos content and in good condition, and that no other asbestos exposure activity was assumed. TEM analysis showed higher exposures to fibers predominantly less than 5 µm in length, whereas these shorter fibers were not counted by PCM. Caution should be exercised in extrapolating the PCM measurements collected during this study to conditions at other sites.

8) When averaged over floor-care condition (poor and good), a 14-fold increase in airborne asbestos concentration was observed during ultra high-speed burnishing, whereas a 9-fold increase was observed during wet stripping. The difference between the increase in airborne asbestos concentrations measured during ultra high-speed burnishing and that measured during wet-stripping was not statistically significant.

9) When averaged over the maintenance procedure (ultra high-speed burnishing and wet-stripping), a 12-fold increase in airborne asbestos concentration was observed during procedures on floors in poor condition, whereas a 10-fold increase was observed during procedures on floors in good condition. The difference between the increase in airborne asbestos concentrations measured on floors in poor condition and those on floors in good condition was not statistically significant.

10) Overall, ultra high-speed burnishing and wet-stripping resulted in an 11-fold increase, on average, in airborne asbestos concentration. This increase was statistically significant.

11) None of the individual airborne total fiber concentrations (determined by PCM) measured during wet-stripping (after ultra high-speed burnishing) of floors in prepared condition exceeded the OSHA PEL of 0.1 f/cm^3. The 8-hr TWA concentrations based on these measured levels and sample durations also did not exceed the OSHA PEL.

12) All of the individual airborne total fiber concentrations (determined by PCM) measured during ultra high-speed burnishing of floors in prepared condition exceeded the OSHA PEL of 0.1 f/cm^3. The 8-hr TWA concentrations based on these measured levels and sample durations (assuming zero concentration beyond that which was measured during the experiment) would also exceed the OSHA PEL. These exceedances, however, were due to the nonasbestos-containing particulate generated during the ultra high-speed burnishing process and not to elevated airborne asbestos particles.

13) This study was conducted on resilient floor tile containing a relatively low percentage of asbestos. That is, the vinyl floor tile contained 3 to 5% chrysotile asbestos, whereas vinyl floor tile generally contains 3 to 25% asbestos. Hence, it is conceivable that floor tile with a higher percentage of asbestos could result in higher levels of airborne asbestos during routine floor-care maintenance activities. The results of this study should be interpreted accordingly.

Recommendations

1) Floor-care treatments systems that include the use of a sealant over which the wax or finish coats are applied should be used on asbestos-containing resilient floor tile. Two or more layers of sealant should be applied as a base coat. The use of multiple layers of sealant on asbestos-containing floor tile can significantly lessen airborne asbestos concentrations during the mechanical removal of the wax or finish from the floor.

2) Two or more layers of wax or finish should also be applied to asbestos-containing resilient floor tile. Although to a lesser extent, multiple layers of floor finish may also provide additional protection against asbestos release during low-speed spray-buffing and ultra high-speed burnishing of asbestos-containing resilient floor tile.

3) The results of this study further support the original U.S. EPA Recommended Interim Guidance for Maintenance of Asbestos-Containing Floor Coverings issued on January 25, 1990. Machine stripping of asbestos-containing resilient floor tile should be conducted only when necessary. Wet-stripping of floors tends to result in higher increases in airborne asbestos concentrations than routine buffing procedures. Floors should be kept adequately wet during stripping. The floor machine should be equipped with the least abrasive pad possible to strip the wax or finish coat from asbestos-containing floor tile.

4) Workers responsible for the maintenance of asbestos-containing floor tile should be trained on the proper use of the floor machines used for low-speed spray-buffing, ultra high-speed burnishing, and wet-stripping, the appropriate buffing and stripping pads, and the selected floor-care treatment system. Workers should also be informed of and follow appropriate operations and maintenance (O&M) work practices and procedures for the maintenance of asbestos-containing resilient floor

The full report was submitted in fulfillment of Contract No. 68-D2-0058, Work Assignment No. II-61 by Environmental Quality Management, Inc. under the sponsorship of the U.S. Environmental Protection Agency.

US DEPARTMENT OF LABOR – OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

- Record Type: Instruction
- Directive Number: CPL 02-02-063
- Old Directive Number: CPL 2-2.63 (REVISED)
- Title: Inspection Procedures for Occupational Exposure to Asbestos Final Rule 29 CFR Parts 1910.1001, 1926.1101, and 1915.1001.
- Information Date: 11/03/1995
- Standard Number: 1910.1001; 1926.1101; 1915.1001

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=DIRECTIVES&p_id=1576

ASBESTOS FLOORING OPERATIONS

Q. When must an employer presume that flooring material contains asbestos?

A. A 1988 EPA survey reported that 42% of public and commercial buildings within the U.S. contain asbestos-containing flooring material. The standard requires that employers presume that floor tile and resilient flooring found in buildings constructed no later than 1980 contains asbestos and take the specific precautions required unless the employer demonstrates that the flooring materials do not contain asbestos, by using recognized analytical techniques.

Q. What work practices are prohibited or restricted in floor maintenance?

A. (1) Sanding of asbestos-containing flooring material is prohibited;(2) stripping of finishes must be conducted using low abrasion pads at speeds lower than 300 rpm and wet methods; and (3) burnishing or dry buffing may be performed only on asbestos-containing flooring which has sufficient finish so that the pad cannot contact the asbestos-containing material.

Q. What work practices must be used when removing floor tile?

A. The floor must first be HEPA-vacuumed. The floor tiles then must be carefully pried up individually after being wetted. Misting is sufficient if the tiles are removed intact. After removal, each tile must be placed in an impermeable trash bag or other impermeable waste container.

Q. If the wetting agent contains a hazardous substance what other precautions must the

A. The employer may be responsible for compliance with other standards such as the Hazard Communication standard. The employer shall obtain a Material Safety Data Sheet for the substance and follow the recommendations for the use of personal protective equipment and provide training.

Q. If floor tiles are broken during removal, are they no longer "intact?"

A. Not necessarily. Some incidental breakage of floor tiles is to be expected. Under the standard, material is not intact only if it has crumbled, been pulverized, or has otherwise deteriorated so that the asbestos fibers are not longer likely to be bound with their matrix. Therefore, the incidental breakage of tiles does not by itself mean that the material is not intact.

Q. How are tiles to be removed when they cannot be removed by careful prying?

A. The tiles may be heated to soften the adhesive holding them to the substrate. When tiles are removed intact using heat, wetting may be omitted.

Q. How are tiles to be removed when they cannot be removed by either careful prying or heating?

A. Aggressive techniques such as mechanical chipping can be used if a competent person evaluates the worksite and determines that additional precautions required by the standard are properly installed and operated. This may include negative pressure enclosures.

Q. How must residual adhesive be removed?

A. The standard does not require removal of residual adhesive, but it is often necessary to remove or smooth residual adhesive to prepare the surface for installation of a new floor. Wet methods must be used when removing residual adhesive. The adhesive must either be wet-scraped manually or removed using low speed floor machine and wetted sand or a removal solution. The adhesive residues must be placed in an impermeable trash bag or other impermeable container while still wet. Remaining water or dirt in the area must then be HEPA vacuumed.

Q. What work practices must be used when removing resilient sheet flooring?

A. The material must not be ripped up. The floor shall first be HEPA vacuumed. The sheet flooring shall then be removed in strips 4 to 8 inches wide. As a strip is removed, the point of separation must be constantly misted to minimize fiber release. A strip must be rolled up as it is removed and the roll placed in an impermeable trash bag or other impermeable container. Residual felt and adhesive is then removed by wet scraping, and the floor is HEPA vacuumed.

Q. When must flooring removal jobs be monitored for asbestos levels?

A. Most jobs will not require monitoring. Monitoring is only required if compliant work practices are not followed, if the material is not removed intact, or if the employees are not properly trained in accordance with the standard.

Q. What level of training is required for competent persons for flooring removal operations?

A. When flooring removal jobs are conducted using compliant work practices and the material is removed intact, the competent person must have completed at least 12 hours of training. If the material is not removed intact, the competent person must have completed a training course that meets the requirement for a Class II competent person.

Q. Must respirators be worn when floor tiles are removed using heat?

A. The standard generally requires that respirators be worn when Class II work, including floor tile removal, is not performed using wet methods. However, the standard allows wetting to be omitted when floor tiles are removed intact using heat. Since the use of heat to remove floor tiles provides the same level of protection against fiber release as the use of wetting, the omission of wetting does not require respirators to be worn when heat is used and the tiles are removed intact. Respirators would only be needed if their use is required under another provision of the standard.

• **Standard Number:** 1926.1101; 1926.1101(b); 1926.1101(g)(8)(i); 1926.1101(g)(8)(i)(D); 1926.1101(g)(8)(vi)

May 18, 2005

Mr. Gerald D. Jeong
Certified Asbestos Consultant
6363 Christie Avenue, Suite 704
Emeryville, CA 94608-1917

Dear Mr. Jeong:

Thank you for your May 21, 2004, letter to the Occupational Safety and Health Administration's (OSHA's) Directorate of Enforcement Programs (DEP). You have questions regarding OSHA's regulation of the removal of asbestos-containing mastic from floors by the construction asbestos standard, 29 CFR 1926.1101. This letter constitutes OSHA's interpretation only of the requirements discussed and may not be applicable to any question not delineated within your original correspondence. Your paraphrased questions and our replies are below.

Question 1: What provisions of the construction asbestos standard prohibit or restrict aggressive methods for removing asbestos-containing mastic from floors?

Reply: An aggressive method, according to the definition at 29 CFR 1926.1101(b), is "...removal or disturbance of building material by sanding, abrading, grinding or other method that breaks, crumbles, or disintegrates intact ACM." Sanding is the only aggressive method for removing asbestos-containing mastic from floors that the asbestos construction standard explicitly prohibits. This prohibition appears in a part of the standard pertaining to removing all asbestos-containing materials (ACM) associated with vinyl and asphalt floor coverings. The specific provision that prohibits the removal of mastic from floors by sanding is 29 CFR 1926.1101(g)(8)(i)(A). This provision pertains to situations where the floor tile or sheeting has been removed but some pieces of the floor tile or sheeting and some adhesive remain in place on the floor. It stipulates: "Flooring or its backing shall not be sanded."

The standard specifies a method for removing asbestos-containing mastic from floors that is less aggressive than sanding, depending on the nature of the mastic. This method is set forth at 29 CFR 1926.1101(g)(8)(i)(D), which states: "All scraping of residual adhesive and/or backing shall be performed using wet methods." This scraping is done by means of a stiff-blade scraper.

Question 2: What criteria does OSHA expect an employer to use to determine whether it is feasible to remove the mastic from the floor manually by means of a stiff-blade scraper using wet methods? Can excessive cost or excessive work time be a valid reason for not using this method?

Reply: Although, according to 29 CFR 1926.1101(g)(8)(i), employers are to remove residual mastic from a floor manually by means of a stiff-blade scraper using wet methods, OSHA entered into a settlement agreement with representatives of the floor-covering business that permits employers to alternatively remove residual mastic by using a low-speed floor machine and wetted sand or a removal solution. Pursuant to the settlement agreement, employers may remove residual mastic by either of these alternative methods even when it is feasible to remove the mastic from the floor manually by means of a stiff-blade scraper. The settlement agreement does not provide the details on how to remove residual mastic by these alternative methods, but OSHA interprets the settlement agreement to require that the procedures set forth in the booklet issued in January 1998 by the Resilient Floor Covering Institute titled, **Recommended Work Practices for Removal of Resilient Floor Coverings** , be followed.

Question 3a: If an electric floor buffer is equipped with an abrasive scrub pad, would using the buffer to remove asbestos-containing floor mastic be classified as an aggressive method?

Reply: Yes, this is an aggressive method of removing the mastic.

Question 3b: Would the use of an electric floor buffer equipped with an abrasive scrub pad be an aggressive method of removing the mastic if the scrub pad is kept immersed in a pool/layer of solvent that has been poured over the floor to soften and dissolve the mastic?

Reply: Yes, this is still an aggressive method of removing the mastic. However, pursuant to the settlement agreement mentioned in the reply to Question 2, this method may be used if the procedures for using a removal solution set forth in **Recommended Work Practices for Removal of Resilient Floor Coverings** are followed exactly. For your convenience we provide the procedures here with some needed clarifications that we have added in brackets.

REMOVAL METHOD #l [This is the method that uses a removal solution.]

a. Start in corner of the room farthest from the entrance door. Apply the removal solution (e.g., "mop on, mop off, no machine scrub," stripping solution) by using a hand sprayer or mop over an area of residual adhesive so that the adhesive in this area always remains wet during its removal. Allow the area to soak for 5-10 minutes. Remove the adhesive using a floor machine equipped with a 3M black floor pad (or equivalent), ensuring that the floor is kept wet in the area where the machine is operating. **[The floor machine must be a low-speed floor machine that spins the floor pads at no greater than 175 revolutions per minute.] Warning**
Electrical shock hazard exists. Use a ground fault circuit interrupter for any electrical connections of equipment used in a wet environment.
b. Occasionally push away the adhesive slurry from the subfloor with a wall or floor scraper or squeegee to check for complete removal. Continue to use the floor machine, equipped with black pad, in the same area until the concrete subfloor is cleaned to the degree necessary for the new floor installation.
c. Adhesive around the edge of the room and in areas that were missed or difficult to reach with the machine can be removed with a hand-held piece of the black floor pad using the above procedures. **Warning**
Electrical shock hazard exists. Use a ground fault interrupter for any electrical connections of equipment used in a wet environment.
d. Wet HEPA vacuum the adhesive slurry. When the HEPA vacuum is full, place commercially suitable water absorbent into the HEPA container until the adhesive slurry is absorbed. An absorbent material may be used on the slurry to absorb the adhesive residue. Place the adhesive waste from the HEPA vacuum or floor into heavy-duty impermeable bags or leak-tight containers with an appropriate label stating, for example "Caution—Contains Asbestos. Avoid Creating Dust. Breathing Asbestos May Cause Bodily Harm." Close and seal the trash bag securely for disposal. Dispose in an approved landfill only.
e. Rinse floor area with clean water using a hand sprayer or mop. Worker footwear should also be cleaned and rinsed.
f. Wet-vacuum standing water with HEPA vacuum cleaner.
g. Continue steps a. through f. until the entire room is complete.
h. Allow subfloor to dry and vacuum with a HEPA vacuum with metal floor attachment.
i. Minimize walking on the wet adhesive to the extent feasible. Worker footwear must be cleaned or removed before leaving the work area.

Question 4: Would the use of an electric floor buffer equipped with broom/brush-like bristles to loosen residual mastic that is immersed within a pool of solvent be an aggressive method for removing the mastic?

Reply: Yes, it is an aggressive method for removing the mastic and applies a work practice that is different from any presented in the construction asbestos standard or permitted by the settlement agreement mentioned in the reply to **Question 2.** Therefore, in order to use this different method, the employer must comply with the provisions set forth in 29 CFR 1926.1101(g)(8)(vi)for using alternative work practices and controls.

As you may know, the State of California administers its own occupational safety and health program under a plan approved and closely monitored by Federal OSHA. Section 18 of the Occupational Safety and Health (OSH) Act requires states to promulgate standards that are, "at least as effective" as the federal standards, although they may be more stringent. Should you wish to contact the State of California, you may direct your inquiry to:

California Department of Industrial Relations
455 Golden Gate Avenue — 10th Floor
San Francisco, California 94102

John Rea, Acting Director
Phone:(415) 703-5050
Fax: (415) 703-5059

Thank you for your interest in occupational safety and health. We hope you find this information helpful. OSHA requirements are set by statute, standards, and regulations. Our interpretation letters explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. This letter constitutes OSHA's interpretation of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. Also, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult the website at http://www.osha.gov. If you have any further questions, please feel free to contact the Office of Health Enforcement at (202) 693-2190.

Sincerely,

Richard E. Fairfax, Director
Directorate of Enforcement Programs

Standard Interpretations - Table of Contents

U.S. Environmental Protection Agency
Applicability Determination Index

Control Number: A060002

Category: Asbestos
EPA Office: CAMPD
Date: 12/05/2005
Title: Removal of Floor Mastic Using a Mechanical Buffer
Recipient: Kasher, Brian
Author: Alushin, Michael
Comments:

Part 61, M	Asbestos

References: 61.141

Abstract:

Q1: Is floor mastic a Category 1 asbestos-containing material under 40 CFR part 61, subpart M?

A1: No. EPA finds that floor mastic is not a Category 1 asbestos-containing material under the Asbestos NESHAP. However, pursuant to 40 CFR 61.141, it is a Category II asbestos-containing material.

Q2: Does the use of a mechanical buffer with an abrasive pad on floor mastic cause the floor mastic to become friable, and thus a Regulated Asbestos-Containing Material (RACM) under 40 CFR part 61, subpart M?

A2: Yes. EPA finds that pursuant to 40 CFR 61.141, the use of a mechanical buffer with an abrasive pad causes floor mastic to become friable and, thus, it is considered a RACM under the asbestos NESHAP.

Letter:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460
OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Mr. Brian Kasher
4512 Sheridan Street
Riverdale Park. Maryland 20737

Dear Mr. Kasher:

This regulatory determination is in response to your e-mail messages of April 17 and April 20, 2005 and subsequent telephone calls. I appreciate your willingness to help us to understand the different types of buffer pads. In your messages, you disagree with a previous applicability determination in which the Agency categorized floor mastic as a Category I asbestos-containing material and

determined that using a mechanical buffer with abrasive pads on floor mastic was potentially subject to the Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP).

Based on further review of your statement that floor mastic is not Category I asbestos-containing material but Category II asbestos-containing material, I agree with you. While floor mastic has chemical and physical properties similar to those materials identified as Category I asbestos-containing materials, it is not specifically identified in the regulations as a Category I asbestos-containing material. Category I asbestos-containing materials "means asbestos-containing packings, gaskets, resilient floor covering and asphalt roofing products containing more than 1 percent asbestos as determined" using polarized light microscopy.

However, the change in category designation does not change the outcome of our previous interpretation. The Agency defines Regulated Asbestos-Containing Material (RACM) as:

(a) Friable asbestos material. (b) Category I nonfriable asbestos- containing material that has become friable, (c) Category I nonfriable asbestos-containing material that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II nonfriable asbestos-containing material that has a high probability of becoming or has become crumbled, pulverized or reduced to powder by the forces expected to act on the material in the course of the demolition or renovation operations. 40 C.F.R. SS 61.141.

In paragraph (d), Category II nonfriable asbestos-containing material (floor mastic) that has a high probability of becoming or has become crumbled, pulverized or reduced to powder by the forces acting on the material during renovation or demolition operations causes the floor mastic to become regulated. The applicable threshold amount, 160 square feet, must also be met for the material to be regulated.

It is EPA's position that the use of a mechanical buffer with an abrasive pad on floor mastic would cause the floor mastic to become friable. Specifically, the application of an abrasive spinning pad creates friction which causes the floor mastic to become crumbled, pulverized or reduced to powder during the renovation or demolition operation. Without the application of solvents or any other liquid to the floor mastic, the floor mastic would create visible emissions. The Agency will not attempt to identify which products are abrasive or non-abrasive from a regulatory perspective. It is the responsibility of the owner/operator to make sure the work practices do not violate the asbestos NESHAP. In conclusion, while the floor mastic was incorrectly categorized in a previous determination, it does not change the outcome of that previous determination.

I appreciate the opportunity to respond to your question. However, if you have additional questions, please contact the Region 3 asbestos NESHAP coordinator, Ms. Tia Chambers. Ms. Chambers telephone number is: (215) 814-2164. If you have specific questions regarding this letter, please contact Everett Bishop of my staff. His telephone number is (202) 564-7032 or by email at bishop.everett@epa.gov.

Very Truly Yours,

Michael Alushin, Director
Compliance Assessment and Media Programs Division Office of Compliance

cc: Chris Kaczmarek, OGC
Susan Fairchild, OAQPS
Charlie Garlow, OCE
Tia Chambers, Region 3

North Carolina Department of Health and Human Services
Division of Public Health • Epidemiology Section
1912 Mail Service Center • Raleigh, North Carolina 27699-1912
Tel 919-733-0820 • Fax 919-733-8493

Michael F. Easley, Governor

Carmen Hooker Odom, Secretary

January 14, 2005

RECEIVED
JAN 27 2005
EPIDEMIOLOGY
HEALTH HAZARDS CONTROL

MEMORANDUM

TO: Building Owners, Contractors and Consultants

FROM: Mary Giguere, CIH, Manager
Health Hazards Control Unit (HHCU)

SUBJECT: U. S. Environmental Protection Agency (EPA) Determination on Removal of Asbestos-Containing Floor Mastic Using a Mechanical Buffer

In a letter dated February 11, 2004, copy enclosed, the EPA stated that the use of solvent and a mechanical buffer to remove asbestos-containing floor mastic is subject to the asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP). Mastic, in good condition, is a Category I, nonfriable, asbestos-containing material (ACM). However, when removed by a mechanical buffer, the mastic becomes a Regulated Asbestos-Containing Material (RACM) since it has been subjected to sanding, grinding, cutting, or abrading as a result of the forces applied to it by the mechanical buffer. The EPA furthermore believes that a mechanical buffer will render asbestos-containing floor mastic as RACM even if a solvent has been applied to break down the mastic.

Based on this interpretation, the requirements of the North Carolina Asbestos Hazard Management Program (AHMP) Rules, 10A NCAC 41C .0600, are applicable when using a mechanical buffer or other similar equipment to remove asbestos-containing floor mastic.

Effective March 1, 2005, mastic removal projects using methods that sand, grind, cut or abrade asbestos-containing mastic, even when a solvent is used, will require a permit, fees and the use of accredited personnel. Also, a design, air monitoring plan and clearance sampling will be required where applicable.

If you have questions regarding this memorandum or need further information on the AHMP Rules or the asbestos NESHAP, please contact my staff at (919) 733-0820.

MG/dgl

Enclosure

Chapter 16: OSHA (See Chapter 16 Reference Materials)

OSHA

Sections:

OSHA 29 CFR 1926.1101, Asbestos Standard for the Construction Industry

Summary of the US OSHA Hazard Communication Standard (HAZCOM; 29 CFR 1926.59)

OSHA 29 CFR Parts 1910 and 1926
Respiratory Protection; Final Rule

§ 1926.1083 Post-dive procedures.

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.423 of this chapter.

[61 FR 31432, June 20, 1996]

SPECIFIC OPERATIONS PROCEDURES

§ 1926.1084 SCUBA diving.

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.424 of this chapter.

[61 FR 31432, June 20, 1996]

§ 1926.1085 Surface-supplied air diving.

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.425 of this chapter.

[61 FR 31432, June 20, 1996]

§ 1926.1086 Mixed-gas diving.

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.426 of this chapter.

[61 FR 31432, June 20, 1996]

§ 1926.1087 Liveboating.

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.427 of this chapter.

[61 FR 31432, June 20, 1996]

EQUIPMENT PROCEDURES AND REQUIREMENTS

§ 1926.1090 Equipment.

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.430 of this chapter.

[61 FR 31432, June 20, 1996]

RECORDKEEPING

§ 1926.1091 Recordkeeping requirements.

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.440 of this chapter.

[61 FR 31432, June 20, 1996]

APPENDIX A TO SUBPART Y OF PART 1926—EXAMPLES OF CONDITIONS WHICH MAY RESTRICT OR LIMIT EXPOSURE TO HYPERBARIC CONDITIONS

NOTE: The requirements applicable to construction work under this appendix A are identical to those set forth at appendix A to Subpart T of part 1910 of this chapter.

[61 FR 31432, June 20, 1996]

APPENDIX B TO SUBPART Y OF PART 1926—GUIDELINES FOR SCIENTIFIC DIVING

NOTE: The requirements applicable to construction work under this appendix B are identical to those set forth at appendix B to subpart T of part 1910 of this chapter.

[61 FR 31433, June 20, 1996]

Subpart Z—Toxic and Hazardous Substances

AUTHORITY: Section 3704 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3701 *et seq.*); Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Orders 12–71 (36 FR 8754), 8–76 (41 FR 25059), 9–83 (48 FR 35736), 1–90 (55 FR 9033), 6–96 (62 FR 111), 3–2000 (62 FR 50017), 5–2002 (67 FR 65008), or 5–2007 (72 FR 31160) as applicable; and 29 CFR part 11.

Section 1926.1102 of 29 CFR Not Issued Under 29 U.S.C. 655 or 29 CFR part 1911; Also Issued Under 5 U.S.C. 553

EFFECTIVE DATE NOTE: At 75 FR 48135, Aug. 9, 2010, the authority citation for subpart Z was revised, effective July 8, 2011. For the convenience of the user, the revised text is set forth as follows:

AUTHORITY: 40 U.S.C. 3701 *et seq.*,; 29 U.S.C. 653, 655, 657; and Secretary of Labor's Order No. 12–71 (36 FR 8754), 8–76 (41 FR 25059), 9–83 (48 FR 35736), 1–90 (55 FR 9033), 6–96 (62 FR 111), 3–2000 (65 FR 50017), 5–2002 (67 FR 65008), 5–2007 (72 FR 31160), or 4–2010 (75 FR 55355), as applicable; and 29 CFR 1911.

Section 1926.1102 of 29 CFR not issued under 29 U.S.C. 655 or 29 CFR 1911; also issued under 5 U.S.C. 553.

SOURCE: 58 FR 35190, June 30, 1993, unless otherwise noted.

§ 1926.1100 [Reserved]

§ 1926.1101 Asbestos.

(a) *Scope and application.* This section regulates asbestos exposure in all work as defined in 29 CFR 1910.12(b), including but not limited to the following:

(1) Demolition or salvage of structures where asbestos is present;

(2) Removal or encapsulation of materials containing asbestos;

(3) Construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof, that contain asbestos;

(4) Installation of products containing asbestos;

(5) Asbestos spill/emergency cleanup; and

(6) Transportation, disposal, storage, containment of and housekeeping activities involving asbestos or products containing asbestos, on the site or location at which construction activities are performed.

(7) Coverage under this standard shall be based on the nature of the work operation involving asbestos exposure.

(8) This section does not apply to asbestos-containing asphalt roof coatings, cements and mastics.

(b) *Definitions.*

Aggressive method means removal or disturbance of building material by sanding, abrading, grinding or other method that breaks, crumbles, or disintegrates intact ACM.

Amended water means water to which surfactant (wetting agent) has been added to increase the ability of the liquid to penetrate ACM.

Asbestos includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that has been chemically treated and/or altered. For purposes of this standard, ''asbestos'' includes PACM, as defined below.

Asbestos-containing material (ACM), means any material containing more than one percent asbestos.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person authorized by the employer and required by work duties to be present in regulated areas.

Building/facility owner is the legal entity, including a lessee, which exercises control over management and record keeping functions relating to a building and/or facility in which activities covered by this standard take place.

Certified Industrial Hygienist (CIH) means one certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.

Class I asbestos work means activities involving the removal of TSI and surfacing ACM and PACM.

Class II asbestos work means activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III asbestos work means repair and maintenance operations, where ''ACM'', including TSI and surfacing ACM and PACM, is likely to be disturbed.

Class IV asbestos work means maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.

Clean room means an uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

Closely resemble means that the major workplace conditions which have contributed to the levels of historic asbestos exposure, are no more protective than conditions of the current workplace.

Competent person means, in addition to the definition in 29 CFR 1926.32 (f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f): in addition, for Class I and Class II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR part 763) for supervisor, or its equivalent and, for Class III and Class IV work, who is trained in a manner consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92 (a)(2).

Critical barrier means one or more layers of plastic sealed over all openings into a work area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a work area from migrating to an adjacent area.

Decontamination area means an enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

Demolition means the wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

Director means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Disturbance means activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or waste bag which shall not exceed 60 inches in length and width.

Employee exposure means that exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.

Equipment room (*change room*) means a contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

Fiber means a particulate form of asbestos, 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

Glovebag means not more than a 60×60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which material and tools may be handled.

High-efficiency particulate air (HEPA) filter means a filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

Homogeneous area means an area of surfacing material or thermal system insulation that is uniform in color and texture.

Industrial hygienist means a professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards.

Intact means that the ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

Modification for purposes of paragraph (g)(6)(ii), means a changed or altered procedure, material or component of a control system, which replaces a procedure, material or component of a required system. Omitting a procedure or component, or reducing or diminishing the stringency or strength of a material or component of the control system is not a ''modification'' for purposes of paragraph (g)(6) of this section.

Negative Initial Exposure Assessment means a demonstration by the employer, which complies with the criteria in paragraph (f)(2)(iii) of this section, that employee exposure during an operation is expected to be consistently below the PELs.

PACM means ''presumed asbestos containing material''.

Presumed Asbestos Containing Material means thermal system insulation and surfacing material found in buildings constructed no later than 1980. The designation of a material as ''PACM'' may be rebutted pursuant to paragraph (k)(5) of this section.

Project Designer means a person who has successfully completed the training requirements for an abatement project designer established by 40 U.S.C. 763.90(g).

Regulated area means: an area established by the employer to demarcate areas where Class I, 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. Requirements for regulated areas are set out in paragraph (e) of this section.

Removal means all operations where ACM and/or PACM is taken out or stripped from structures or substrates, and includes demolition operations.

Renovation means the modifying of any existing structure, or portion thereof.

Repair means overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

Surfacing material means material that is sprayed, 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, and other purposes).

Surfacing ACM means surfacing material which contains more than 1% asbestos.

Thermal system insulation (TSI) means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.

Thermal system insulation ACM is thermal system insulation which contains more than 1% asbestos.

(c) *Permissible exposure limits (PELS)*—(1) *Time-weighted average limit (TWA).* The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter of air as an eight (8) hour time-weighted average (TWA), as determined by the method prescribed in appendix A to this section, or by an equivalent method.

(2) *Excursion limit.* The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes, as determined by the method prescribed in appendix A to this section, or by an equivalent method.

(d) *Multi-employer worksites.* (1) On multi-employer worksites, an employer performing work requiring the establishment of a regulated area shall inform other employers on the site of the nature of the employer's work with asbestos and/or PACM, of the existence of and requirements pertaining to regulated areas, and the measures taken to ensure that employees of such other employers are not exposed to asbestos.

(2) Asbestos hazards at a multi-employer work site shall be abated by the contractor who created or controls the source of asbestos contamination. For example, if there is a significant breach of an enclosure containing Class I work, the employer responsible for erecting the enclosure shall repair the breach immediately.

(3) In addition, all employers of employees exposed to asbestos hazards shall comply with applicable protective provisions to protect their employees. For example, if employees working immediately adjacent to a Class I asbestos job are exposed to asbestos due to the inadequate containment of such job, their employer shall either remove the employees from the area until the enclosure breach is repaired; or perform an initial exposure assessment pursuant to (f) of this section.

(4) All employers of employees working adjacent to regulated areas established by another employer on a multi-employer work-site, shall take steps on a daily basis to ascertain the integrity of the enclosure and/or the effectiveness of the control method relied on by the primary asbestos contractor to assure that asbestos fibers do not migrate to such adjacent areas.

(5) All general contractors on a construction project which includes work covered by this standard shall be deemed to exercise general supervisory authority over the work covered by this standard, even though the general contractor is not qualified to serve as the asbestos ''competent person'' as defined by paragraph (b) of this section. As supervisor of the entire project, the general contractor shall ascertain whether the asbestos contractor is in compliance with this standard, and shall require such contractor to come into compliance with this standard when necessary.

(e) *Regulated areas.* (1) All Class I, II and III asbestos work shall be conducted within regulated areas. All other operations covered by this standard shall be conducted within a regulated area where airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed

a PEL. Regulated areas shall comply with the requirements of paragraphs (2), (3),(4) and (5) of this section.

(2) *Demarcation.* The regulated area shall be demarcated in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne asbestos. Where critical barriers or negative pressure enclosures are used, they may demarcate the regulated area. Signs shall be provided and displayed pursuant to the requirements of paragraph (k)(7) of this section.

(3) *Access.* Access to regulated areas shall be limited to authorized persons and to persons authorized by the Act or regulations issued pursuant thereto.

(4) *Respirators.* All persons entering a regulated area where employees are required pursuant to paragraph (h)(1) of this section to wear respirators shall be supplied with a respirator selected in accordance with paragraph (h)(2) of this section.

(5) *Prohibited activities.* The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the regulated area.

(6) *Competent Persons.* The employer shall ensure that all asbestos work performed within regulated areas is supervised by a competent person, as defined in paragraph (b) of this section. The duties of the competent person are set out in paragraph (o) of this section.

(f) *Exposure assessments and monitoring*—(1) *General monitoring criteria.* (i) Each employer who has a workplace or work operation where exposure monitoring is required under this section shall perform monitoring to determine accurately the airborne concentrations of asbestos to which employees may be exposed.

(ii) Determinations of employee exposure shall be made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee.

(iii) Representative 8-hour TWA employee exposure shall be determined on the basis of one or more samples representing full-shift exposure for employees in each work area. Representative 30-minute short-term employee exposures shall be determined on the basis of one or more samples representing 30 minute exposures associated with operations that are most likely to produce exposures above the excursion limit for employees in each work area.

(2) *Initial Exposure Assessment.* (i) Each employer who has a workplace or work operation covered by this standard shall ensure that a ''competent person'' conducts an exposure assessment immediately before or at the initiation of the operation to ascertain expected exposures during that operation or workplace. The assessment must be completed in time to comply with requirements which are triggered by exposure data or the lack of a ''negative exposure assessment,'' and to provide information necessary to assure that all control systems planned are appropriate for that operation and will work properly.

(ii) Basis of Initial Exposure Assessment: Unless a negative exposure assessment has been made pursuant to paragraph (f)(2)(iii) of this section, the initial exposure assessment shall, if feasible, be based on monitoring conducted pursuant to paragraph (f)(1)(iii) of this section. The assessment shall take into consideration both the monitoring results and all observations, information or calculations which indicate employee exposure to asbestos, including any previous monitoring conducted in the workplace, or of the operations of the employer which indicate the levels of airborne asbestos likely to be encountered on the job. For Class I asbestos work, until the employer conducts exposure monitoring and documents that employees on that job will not be exposed in excess of the PELs, or otherwise makes a negative exposure assessment pursuant to paragraph (f)(2)(iii) of this section, the employer shall presume that employees are exposed in excess of the TWA and excursion limit.

(iii) Negative Exposure Assessment: For any one specific asbestos job which will be performed by employees who have been trained in compliance with the standard, the employer may demonstrate that employee exposures will be below the PELs by data which conform to the following criteria;

(A) Objective data demonstrating that the product or material containing asbestos minerals or the activity involving such product or material cannot release airborne fibers in concentrations exceeding the TWA and excursion limit under those work conditions having the greatest potential for releasing asbestos; or

(B) Where the employer has monitored prior asbestos jobs for the PEL and the excursion limit within 12 months of the current or projected job, the monitoring and analysis were performed in compliance with the asbestos standard in effect; and the data were obtained during work operations conducted under workplace conditions ''closely resembling'' the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations, the operations were conducted by employees whose training and experience are no more extensive than that of employees performing the current job, and these data show that under the conditions prevailing and which will prevail in the current workplace there is a high degree of certainty that employee exposures will not exceed the TWA and excursion limit; or

(C) The results of initial exposure monitoring of the current job made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee covering operations which are most likely during the performance of the entire asbestos job to result in exposures over the PELs.

(3) *Periodic monitoring*—(i) *Class I and II operations.* The employer shall conduct daily monitoring that is representative of the exposure of each employee who is assigned to work within a regulated area who is performing Class I or II work, unless the employer pursuant to (f)(2)(iii) of this section, has made a negative exposure assessment for the entire operation.

(ii) All operations under the standard other than Class I and II operations. The employer shall conduct periodic monitoring of all work where exposures are expected to exceed a PEL, at intervals sufficient to document the validity of the exposure prediction.

(iii) Exception: When all employees required to be monitored daily are equipped with supplied-air respirators operated in the pressure demand mode, or other positive pressure mode respirator, the employer may dispense with the daily monitoring required by this paragraph. However, employees performing Class I work using a control method which is not listed in paragraph (g)(4) (i), (ii), or (iii) of this section or using a modification of a listed control method, shall continue to be monitored daily even if they are equipped with supplied-air respirators.

(4) *Termination of monitoring.* (i) If the periodic monitoring required by paragraph (f)(3) of this section reveals that employee exposures, as indicated by statistically reliable measurements, are below the permissible exposure limit and excursion limit the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.

(ii) Additional monitoring. Notwithstanding the provisions of paragraph (f)(2) and (3), and (f)(4) of this section, the employer shall institute the exposure monitoring required under paragraph (f)(3) of this section whenever there has been a change in process, control equipment, personnel or work practices that may result in new or additional exposures above the permissible exposure limit and/or excursion limit or when the employer has any reason to suspect that a change may result in new or additional exposures above the permissible exposure limit and/or excursion limit. Such additional monitoring is required regardless of whether a ''negative exposure assessment'' was previously produced for a specific job.

(5) *Employee notification of monitoring results.* The employer must, as soon as possible but no later than 5 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(6) *Observation of monitoring.* (i) The employer shall provide affected employees and their designated representatives an opportunity to observe any

monitoring of employee exposure to asbestos conducted in accordance with this section.

(ii) When observation of the monitoring of employee exposure to asbestos requires entry into an area where the use of protective clothing or equipment is required, the observer shall be provided with and be required to use such clothing and equipment and shall comply with all other applicable safety and health procedures.

(g) *Methods of compliance.* (1) Engineering controls and work practices for all operations covered by this section. The employer shall use the following engineering controls and work practices in all operations covered by this section, regardless of the levels of exposure:

(i) Vacuum cleaners equipped with HEPA filters to collect all debris and dust containing ACM and PACM, except as provided in paragraph (g)(8)(ii) of this section in the case of roofing material.

(ii) Wet methods, or wetting agents, to control employee exposures during asbestos handling, mixing, removal, cutting, application, and cleanup, except where employers demonstrate that the use of wet methods is infeasible due to for example, the creation of electrical hazards, equipment malfunction, and, in roofing, except as provided in paragraph (g)(8)(ii) of this section; and

(iii) Prompt clean-up and disposal of wastes and debris contaminated with asbestos in leak-tight containers except in roofing operations, where the procedures specified in paragraph (g)(8)(ii) of this section apply.

(2) In addition to the requirements of paragraph (g)(1) of this section, the employer shall use the following control methods to achieve compliance with the TWA permissible exposure limit and excursion limit prescribed by paragraph (c) of this section;

(i) Local exhaust ventilation equipped with HEPA filter dust collection systems;

(ii) Enclosure or isolation of processes producing asbestos dust;

(iii) Ventilation of the regulated area to move contaminated air away from the breathing zone of employees and toward a filtration or collection device equipped with a HEPA filter;

(iv) Use of other work practices and engineering controls that the Assistant Secretary can show to be feasible.

(v) Wherever the feasible engineering and work practice controls described above are not sufficient to reduce employee exposure to or below the permissible exposure limit and/or excursion limit prescribed in paragraph (c) of this section, the employer shall use them to reduce employee exposure to the lowest levels attainable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (h) of this section.

(3) *Prohibitions.* The following work practices and engineering controls shall not be used for work related to asbestos or for work which disturbs ACM or PACM, regardless of measured levels of asbestos exposure or the results of initial exposure assessments:

(i) High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.

(ii) Compressed air used to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

(iii) Dry sweeping, shoveling or other dry clean-up of dust and debris containing ACM and PACM.

(iv) Employee rotation as a means of reducing employee exposure to asbestos.

(4) *Class I Requirements.* In addition to the provisions of paragraphs (g) (1) and (2) of this section, the following engineering controls and work practices and procedures shall be used.

(i) All Class I work, including the installation and operation of the control system shall be supervised by a competent person as defined in paragraph (b) of this section;

(ii) For all Class I jobs involving the removal of more than 25 linear or 10 square feet of thermal system insulation or surfacing material; for all other Class I jobs, where the employer cannot produce a negative exposure assessment pursuant to paragraph (f)(2)(iii)

of this section, or where employees are working in areas adjacent to the regulated area, while the Class I work is being performed, the employer shall use one of the following methods to ensure that airborne asbestos does not migrate from the regulated area:

(A) Critical barriers shall be placed over all the openings to the regulated area, except where activities are performed outdoors; or

(B) The employer shall use another barrier or isolation method which prevents the migration of airborne asbestos from the regulated area, as verified by perimeter area surveillance during each work shift at each boundary of the regulated area, showing no visible asbestos dust; and perimeter area monitoring showing that clearance levels contained in 40 CFR part 763, subpt. E, of the EPA Asbestos in Schools Rule are met, or that perimeter area levels, measured by Phase Contrast Microscopy (PCM) are no more than background levels representing the same area before the asbestos work began. The results of such monitoring shall be made known to the employer no later than 24 hours from the end of the work shift represented by such monitoring. Exception: For work completed outdoors where employees are not working in areas adjacent to the regulated areas, this paragraph (g)(4)(ii) is satisfied when the specific control methods in paragraph (g)(5) of this section are used.

(iii) For all Class I jobs, HVAC systems shall be isolated in the regulated area by sealing with a double layer of 6 mil plastic or the equivalent;

(iv) For all Class I jobs, impermeable dropcloths shall be placed on surfaces beneath all removal activity;

(v) For all Class I jobs, all objects within the regulated area shall be covered with impermeable dropcloths or plastic sheeting which is secured by duct tape or an equivalent.

(vi) For all Class I jobs where the employer cannot produce a negative exposure assessment, or where exposure monitoring shows that a PEL is exceeded, the employer shall ventilate the regulated area to move contaminated air away from the breathing zone of employees toward a HEPA filtration or collection device.

(5) *Specific control methods for Class I work.* In addition, Class I asbestos work shall be performed using one or more of the following control methods pursuant to the limitations stated below:

(i) Negative Pressure Enclosure (NPE) systems: NPE systems may be used where the configuration of the work area does not make the erection of the enclosure infeasible, with the following specifications and work practices.

(A) *Specifications:*

(*1*) The negative pressure enclosure (NPE) may be of any configuration,

(*2*) At least 4 air changes per hour shall be maintained in the NPE,

(*3*) A minimum of −0.02 column inches of water pressure differential, relative to outside pressure, shall be maintained within the NPE as evidenced by manometric measurements,

(*4*) The NPE shall be kept under negative pressure throughout the period of its use, and

(*5*) Air movement shall be directed away from employees performing asbestos work within the enclosure, and toward a HEPA filtration or a collection device.

(B) *Work Practices:*

(*1*) Before beginning work within the enclosure and at the beginning of each shift, the NPE shall be inspected for breaches and smoke-tested for leaks, and any leaks sealed.

(*2*) Electrical circuits in the enclosure shall be deactivated, unless equipped with ground-fault circuit interrupters.

(ii) Glove bag systems may be used to remove PACM and/or ACM from straight runs of piping and elbows and other connections with the following specifications and work practices:

(A) *Specifications:*

(*1*) Glovebags shall be made of 6 mil thick plastic and shall be seamless at the bottom.

(*2*) Glovebags used on elbows and other connections must be designed for that purpose and used without modifications.

(B) *Work Practices:*

(*1*) Each glovebag shall be installed so that it completely covers the circumference of pipe or other structure where the work is to be done.

(*2*) Glovebags shall be smoke-tested for leaks and any leaks sealed prior to use.

(*3*) Glovebags may be used only once and may not be moved.

(*4*) Glovebags shall not be used on surfaces whose temperature exceeds 150 °F.

(*5*) Prior to disposal, glovebags shall be collapsed by removing air within them using a HEPA vacuum.

(*6*) Before beginning the operation, loose and friable material adjacent to the glovebag/box operation shall be wrapped and sealed in two layers of six mil plastic or otherwise rendered intact,

(*7*) Where system uses attached waste bag, such bag shall be connected to collection bag using hose or other material which shall withstand pressure of ACM waste and water without losing its integrity:

(*8*) Sliding valve or other device shall separate waste bag from hose to ensure no exposure when waste bag is disconnected:

(*9*) At least two persons shall perform Class I glovebag removal operations.

(iii) *Negative Pressure Glove Bag Systems*. Negative pressure glove bag systems may be used to remove ACM or PACM from piping.

(A) *Specifications:* In addition to specifications for glove bag systems above, negative pressure glove bag systems shall attach HEPA vacuum systems or other devices to bag to prevent collapse during removal.

(B) *Work Practices:* (*1*) The employer shall comply with the work practices for glove bag systems in paragraph (g)(5)(ii)(B)(*4*) of this section.

(*2*) The HEPA vacuum cleaner or other device used to prevent collapse of bag during removal shall run continually during the operation until it is completed at which time the bag shall be collapsed prior to removal of the bag from the pipe.

(*3*) Where a separate waste bag is used along with a collection bag and discarded after one use, the collection bag may be reused if rinsed clean with amended water before reuse.

(iv) Negative Pressure Glove Box Systems: Negative pressure glove boxes may be used to remove ACM or PACM from pipe runs with the following specifications and work practices.

(A) *Specifications:*

(*1*) Glove boxes shall be constructed with rigid sides and made from metal or other material which can withstand the weight of the ACM and PACM and water used during removal:

(*2*) A negative pressure generator shall be used to create negative pressure in the system:

(*3*) An air filtration unit shall be attached to the box:

(*4*) The box shall be fitted with gloved apertures:

(*5*) An aperture at the base of the box shall serve as a bagging outlet for waste ACM and water:

(*6*) A back-up generator shall be present on site:

(*7*) Waste bags shall consist of 6 mil thick plastic double-bagged before they are filled or plastic thicker than 6 mil.

(B) *Work practices:*

(*1*) At least two persons shall perform the removal:

(*2*) The box shall be smoke-tested for leaks and any leaks sealed prior to each use.

(*3*) Loose or damaged ACM adjacent to the box shall be wrapped and sealed in two layers of 6 mil plastic prior to the job, or otherwise made intact prior to the job.

(*4*) A HEPA filtration system shall be used to maintain pressure barrier in box.

(v) *Water Spray Process System*. A water spray process system may be used for removal of ACM and PACM from cold line piping if, employees carrying out such process have completed a 40-hour separate training course in its use, in addition to training required for employees performing Class I work. The system shall meet the following specifications and shall be performed by employees using the following work practices.

(A) *Specifications:*

(*1*) Piping shall be surrounded on 3 sides by rigid framing,

(*2*) A 360 degree water spray, delivered through nozzles supplied by a high pressure separate water line, shall be formed around the piping.

(*3*) The spray shall collide to form a fine aerosol which provides a liquid

barrier between workers and the ACM and PACM.

(B) *Work Practices:*

(*1*) The system shall be run for at least 10 minutes before removal begins.

(*2*) All removal shall take place within the water barrier.

(*3*) The system shall be operated by at least three persons, one of whom shall not perform removal, but shall check equipment, and ensure proper operation of the system.

(*4*) After removal, the ACM and PACM shall be bagged while still inside the water barrier.

(vi) A small walk-in enclosure which accommodates no more than two persons (mini-enclosure) may be used if the disturbance or removal can be completely contained by the enclosure with the following specifications and work practices.

(A) *Specifications:*

(*1*) The fabricated or job-made enclosure shall be constructed of 6 mil plastic or equivalent:

(*2*) The enclosure shall be placed under negative pressure by means of a HEPA filtered vacuum or similar ventilation unit:

(B) *Work practices:*

(*1*) Before use, the mini-enclosure shall be inspected for leaks and smoke-tested to detect breaches, and any breaches sealed.

(*2*) Before reuse, the interior shall be completely washed with amended water and HEPA-vacuumed.

(*3*) During use, air movement shall be directed away from the employee's breathing zone within the mini-enclosure.

(6) *Alternative control methods for Class I work.* Class I work may be performed using a control method which is not referenced in paragraph (g)(5) of this section, or which modifies a control method referenced in paragraph (g)(5)of this section, if the following provisions are complied with:

(i) The control method shall enclose, contain or isolate the processes or source of airborne asbestos dust, or otherwise capture or redirect such dust before it enters the breathing zone of employees.

(ii) A certified industrial hygienist or licensed professional engineer who is also qualified as a project designer as defined in paragraph (b) of this section, shall evaluate the work area, the projected work practices and the engineering controls and shall certify in writing that the planned control method is adequate to reduce direct and indirect employee exposure to below the PELs under worst-case conditions of use, and that the planned control method will prevent asbestos contamination outside the regulated area, as measured by clearance sampling which meets the requirements of EPA's Asbestos in Schools rule issued under AHERA, or perimeter monitoring which meets the criteria in paragraph (g)(4)(ii)(B) of this section.

(A) Where the TSI or surfacing material to be removed is 25 linear or 10 square feet or less , the evaluation required in paragraph (g)(6) of this section may be performed by a ''competent person'', and may omit consideration of perimeter or clearance monitoring otherwise required.

(B) The evaluation of employee exposure required in paragraph (g)(6) of this section, shall include and be based on sampling and analytical data representing employee exposure during the use of such method under worst-case conditions and by employees whose training and experience are equivalent to employees who are to perform the current job.

(7) Work Practices and Engineering Controls for Class II work.

(i) All Class II work shall be supervised by a competent person as defined in paragraph (b) of this section.

(ii) For all indoor Class II jobs, where the employer has not produced a negative exposure assessment pursuant to paragraph (f)(2)(iii) of this section, or where during the job, changed conditions indicate there may be exposure above the PEL or where the employer does not remove the ACM in a substantially intact state, the employer shall use one of the following methods to ensure that airborne asbestos does not migrate from the regulated area;

(A) Critical barriers shall be placed over all openings to the regulated area; or,

(B) The employer shall use another barrier or isolation method which prevents the migration of airborne asbestos from the regulated area, as verified

by perimeter area monitoring or clearance monitoring which meets the criteria set out in paragraph (g)(4)(ii)(B) of this section.

(C) Impermeable dropcloths shall be placed on surfaces beneath all removal activity;

(iii) [Reserved]

(iv) All Class II asbestos work shall be performed using the work practices and requirements set out above in paragraph (g)(1) (i) through (g)(1)(iii) of this section.

(8) *Additional Controls for Class II work.* Class II asbestos work shall also be performed by complying with the work practices and controls designated for each type of asbestos work to be performed, set out in this paragraph. Where more than one control method may be used for a type of asbestos work, the employer may choose one or a combination of designated control methods. Class II work also may be performed using a method allowed for Class I work, except that glove bags and glove boxes are allowed if they fully enclose the Class II material to be removed.

(i) For removing vinyl and asphalt flooring materials which contain ACM or for which in buildings constructed no later than 1980, the employer has not verified the absence of ACM pursuant to paragraph (g)(8)(i)(I) of this section. The employer shall ensure that employees comply with the following work practices and that employees are trained in these practices pursuant to paragraph (k)(9):

(A) Flooring or its backing shall not be sanded.

(B) Vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) shall be used to clean floors.

(C) Resilient sheeting shall be removed by cutting with wetting of the snip point and wetting during delamination. Rip-up of resilient sheet floor material is prohibited.

(D) All scraping of residual adhesive and/or backing shall be performed using wet methods.

(E) Dry sweeping is prohibited.

(F) Mechanical chipping is prohibited unless performed in a negative pressure enclosure which meets the requirements of paragraph (g)(5)(i) of this section.

(G) Tiles shall be removed intact, unless the employer demonstrates that intact removal is not possible.

(H) When tiles are heated and can be removed intact, wetting may be omitted.

(I) Resilient flooring material including associated mastic and backing shall be assumed to be asbestos-containing unless an industrial hygienist determines that it is asbestos-free using recognized analytical techniques.

(ii) For removing roofing material which contains ACM the employer shall ensure that the following work practices are followed:

(A) Roofing material shall be removed in an intact state to the extent feasible.

(B) Wet methods shall be used to remove roofing materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards.

(C) Cutting machines shall be continuously misted during use, unless a competent person determines that misting substantially decreases worker safety.

(D) When removing built-up roofs with asbestos-containing roofing felts and an aggregate surface using a power roof cutter, all dust resulting from the cutting operation shall be collected by a HEPA dust collector, or shall be HEPA vacuumed by vacuuming along the cut line. When removing built-up roofs with asbestos-containing roofing felts and a smooth surface using a power roof cutter, the dust resulting from the cutting operation shall be collected either by a HEPA dust collector or HEPA vacuuming along the cut line, or by gently sweeping and then carefully and completely wiping up the still-wet dust and debris left along the cut line. The dust and debris shall be immediately bagged or placed in covered containers.

(E) Asbestos-containing material that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist:

(*1*) Any ACM that is not intact shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift. While the material remains on the roof it shall either be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting.

(*2*) Intact ACM shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift.

(F) Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust.

(G) Roof level heating and ventilation air intake sources shall be isolated or the ventilation system shall be shut down.

(H) Notwithstanding any other provision of this section, removal or repair of sections of intact roofing less than 25 square feet in area does not require use of wet methods or HEPA vacuuming as long as manual methods which do not render the material nonintact are used to remove the material and no visible dust is created by the removal method used. In determining whether a job involves less than 25 square feet, the employer shall include all removal and repair work performed on the same roof on the same day.

(iii) When removing cementitious asbestos-containing siding and shingles or transite panels containing ACM on building exteriors (other than roofs, where paragraph (g)(8)(ii) of this section applies) the employer shall ensure that the following work practices are followed:

(A) Cutting, abrading or breaking siding, shingles, or transite panels, shall be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release cannot be used.

(B) Each panel or shingle shall be sprayed with amended water prior to removal.

(C) Unwrapped or unbagged panels or shingles shall be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift.

(D) Nails shall be cut with flat, sharp instruments.

(iv) When removing gaskets containing ACM, the employer shall ensure that the following work practices are followed:

(A) If a gasket is visibly deteriorated and unlikely to be removed intact, removal shall be undertaken within a glovebag as described in paragraph (g)(5)(ii) of this section.

(B) [Reserved]

(C) The gasket shall be immediately placed in a disposal container.

(D) Any scraping to remove residue must be performed wet.

(v) When performing any other Class II removal of asbestos containing material for which specific controls have not been listed in paragraph (g)(8)(iv)(A) through (D) of this section, the employer shall ensure that the following work practices are complied with.

(A) The material shall be thoroughly wetted with amended water prior to and during its removal.

(B) The material shall be removed in an intact state unless the employer demonstrates that intact removal is not possible.

(C) Cutting, abrading or breaking the material shall be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release are not feasible.

(D) Asbestos-containing material removed, shall be immediately bagged or wrapped, or kept wetted until transferred to a closed receptacle, no later than the end of the work shift.

(vi) *Alternative Work Practices and Controls.* Instead of the work practices and controls listed in paragraph (g)(8)(i) through (v) of this section, the employer may use different or modified engineering and work practice controls if the following provisions are complied with.

(A) The employer shall demonstrate by data representing employee exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used, that employee exposure will not exceed the PELs under any anticipated circumstances.

(B) A competent person shall evaluate the work area, the projected work practices and the engineering controls,

and shall certify in writing, that the different or modified controls are adequate to reduce direct and indirect employee exposure to below the PELs under all expected conditions of use and that the method meets the requirements of this standard. The evaluation shall include and be based on data representing employee exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used for the current job, and by employees whose training and experience are equivalent to employees who are to perform the current job.

(9) *Work Practices and Engineering Controls for Class III asbestos work.* Class III asbestos work shall be conducted using engineering and work practice controls which minimize the exposure to employees performing the asbestos work and to bystander employees.

(i) The work shall be performed using wet methods.

(ii) To the extent feasible, the work shall be performed using local exhaust ventilation.

(iii) Where the disturbance involves drilling, cutting, abrading, sanding, chipping, breaking, or sawing of thermal system insulation or surfacing material, the employer shall use impermeable dropcloths, and shall isolate the operation using mini-enclosures or glove bag systems pursuant to paragraph (g)(5) of this section or another isolation method.

(iv) Where the employer does not produce a ''negative exposure assessment'' for a job, or where monitoring results show the PEL has been exceeded, the employer shall contain the area using impermeable dropcloths and plastic barriers or their equivalent, or shall isolate the operation using a control system listed in and in compliance with paragraph (g)(5) of this section.

(v) Employees performing Class III jobs, which involve the disturbance of thermal system insulation or surfacing material, or where the employer does not produce a ''negative exposure assessment'' or where monitoring results show a PEL has been exceeded, shall wear respirators which are selected, used and fitted pursuant to provisions of paragraph (h) of this section.

(10) *Class IV asbestos work.* Class IV asbestos jobs shall be conducted by employees trained pursuant to the asbestos awareness training program set out in paragraph (k)(9) of this section. In addition, all Class IV jobs shall be conducted in conformity with the requirements set out in paragraph (g)(1) of this section, mandating wet methods, HEPA vacuums, and prompt clean up of debris containing ACM or PACM.

(i) Employees cleaning up debris and waste in a regulated area where respirators are required shall wear respirators which are selected, used and fitted pursuant to provisions of paragraph (h) of this section.

(ii) Employers of employees who clean up waste and debris in, and employers in control of, areas where friable thermal system insulation or surfacing material is accessible, shall assume that such waste and debris contain asbestos.

(11) *Alternative methods of compliance for installation, removal, repair, and maintenance of certain roofing and pipeline coating materials.* Notwithstanding any other provision of this section, an employer who complies with all provisions of this paragraph (g)(11) when installing, removing, repairing, or maintaining intact pipeline asphaltic wrap, or roof flashings which contain asbestos fibers encapsulated or coated by bituminous or resinous compounds shall be deemed to be in compliance with this section. If an employer does not comply with all provisions of this paragraph (g)(11) or if during the course of the job the material does not remain intact, the provisions of paragraph (g)(8) of this section apply instead of this paragraph (g)(11).

(i) Before work begins and as needed during the job, a competent person who is capable of identifying asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective measures to eliminate such hazards, shall conduct an inspection of the worksite and determine that the roofing material is intact and will likely remain intact.

(ii) All employees performing work covered by this paragraph (g)(11) shall be trained in a training program that

meets the requirements of paragraph (k)(9)(viii) of this section.

(iii) The material shall not be sanded, abraded, or ground. Manual methods which do not render the material non-intact shall be used.

(iv) Material that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist. All such material shall be removed from the roof as soon as is practicable, but in any event no later than the end of the work shift.

(v) Where roofing products which have been labeled as containing asbestos pursuant to paragraph (k)(8) of this section are installed on non-residential roofs during operations covered by this paragraph (g)(11), the employer shall notify the building owner of the presence and location of such materials no later than the end of the job.

(vi) All removal or disturbance of pipeline asphaltic wrap shall be performed using wet methods.

(h) *Respiratory protection*—(1) *General.* For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Class I asbestos work.

(ii) Class II asbestos work when ACM is not removed in a substantially intact state.

(iii) Class II and III asbestos work that is not performed using wet methods, except for removal of ACM from sloped roofs when a negative-exposure assessment has been conducted and ACM is removed in an intact state.

(iv) Class II and III asbestos work for which a negative-exposure assessment has not been conducted.

(v) Class III asbestos work when TSI or surfacing ACM or PACM is being disturbed.

(vi) Class IV asbestos work performed within regulated areas where employees who are performing other work are required to use respirators.

(vii) Work operations covered by this section for which employees are exposed above the TWA or excursion limit.

(viii) Emergencies.

(2) *Respirator program.* (i) The employer must implement a respiratory protection program in accordance with §1910.134 (b) through (d) (except (d)(1)(iii)), and (f) through (m), which covers each employee required by this section to use a respirator.

(ii) No employee shall be assigned to asbestos work that requires respirator use if, based on their most recent medical examination, the examining physician determines that the employee will be unable to function normally while using a respirator, or that the safety or health of the employee or other employees will be impaired by the employee's respirator use. Such employees must be assigned to another job or given the opportunity to transfer to a different position that they can perform. If such a transfer position is available, it must be with the same employer, in the same geographical area, and with the same seniority, status, rate of pay, and other job benefits the employee had just prior to such transfer.

(3) *Respirator selection.* (i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134; however, employers must not select or use filtering facepiece respirators for use against asbestos fibers.

(B) Provide HEPA filters for powered and non-powered air-purifying respirators.

(ii) Employers must provide an employee with tight-fitting, powered air-purifying respirator (PAPR) instead of a negative pressure respirator selected according to paragraph (h)(3)(i)(A) of this standard when the employee chooses to use a PAPR and it provides adequate protection to the employee.

(iii) Employers must provide employees with an air-purifying half mask respirator, other than a filtering facepiece respirator, whenever the employees perform:

(A) Class II or Class III asbestos work for which no negative exposure assessment is available.

(B) Class III asbestos work involving disturbance of TSI or surfacing ACM or PACM.

(iv) Employers must provide employees with:

(A) A tight-fitting powered air-purifying respirator or a full facepiece, supplied-air respirator operated in the pressure-demand mode and equipped with either HEPA egress cartridges or an auxiliary positive-pressure, self-contained breathing apparatus (SCBA) whenever the employees are in a regulated area performing Class I asbestos work for which a negative exposure assessment is not available and the exposure assessment indicates that the exposure level will be at or below 1 f/cc as an 8-hour time-weighted average (TWA).

(B) A full facepiece supplied-air respirator operated in the pressure-demand mode and equipped with an auxiliary positive-pressure SCBA whenever the employees are in a regulated area performing Class I asbestos work for which a negative exposure assessment is not available and the exposure assessment indicates that the exposure level will be above 1 f/cc as an 8-hour TWA.

(i) *Protective clothing*—(1) *General.* The employer shall provide or require the use of protective clothing, such as coveralls or similar whole-body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos that exceed the TWA and/or excursion limit prescribed in paragraph (c) of this section, or for which a required negative exposure assessment is not produced, or for any employee performing Class I operations which involve the removal of over 25 linear or 10 square feet of TSI or surfacing ACM and PACM.

(2) *Laundering.* (i) The employer shall ensure that laundering of contaminated clothing is done so as to prevent the release of airborne asbestos in excess of the TWA or excursion limit prescribed in paragraph (c) of this section.

(ii) Any employer who gives contaminated clothing to another person for laundering shall inform such person of the requirement in paragraph (i)(2)(i) of this section to effectively prevent the release of airborne asbestos in excess of the TWA and excursion limit prescribed in paragraph (c) of this section.

(3) *Contaminated clothing.* Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and be labeled in accordance with paragraph (k) of this section.

(4) *Inspection of protective clothing.* (i) The competent person shall examine worksuits worn by employees at least once per workshift for rips or tears that may occur during performance of work.

(ii) When rips or tears are detected while an employee is working, rips and tears shall be immediately mended, or the worksuit shall be immediately replaced.

(j) *Hygiene facilities and practices for employees.* (1) Requirements for employees performing Class I asbestos jobs involving over 25 linear or 10 square feet of TSI or surfacing ACM and PACM.

(i) *Decontamination areas.* The employer shall establish a decontamination area that is adjacent and connected to the regulated area for the decontamination of such employees. The decontamination area shall consist of an equipment room, shower area, and clean room in series. The employer shall ensure that employees enter and exit the regulated area through the decontamination area.

(A) *Equipment room.* The equipment room shall be supplied with impermeable, labeled bags and containers for the containment and disposal of contaminated protective equipment.

(B) *Shower area.* Shower facilities shall be provided which comply with 29 CFR 1910.141(d)(3), unless the employer can demonstrate that they are not feasible. The showers shall be adjacent both to the equipment room and the clean room, unless the employer can demonstrate that this location is not feasible. 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 worksuits 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 worksuits in the equipment room, then

don clean worksuits, and proceed to a shower that is not adjacent to the work area.

(C) *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.

(ii) *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.

(iii) *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.

(iv) *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.

(2) Requirements for Class I work involving less than 25 linear or 10 square feet of TSI or surfacing ACM and PACM, and for Class II and Class III asbestos work operations where exposures exceed a PEL or where there is no negative exposure assessment produced before the operation.

(i) The employer shall establish an equipment room or area that is adjacent to the regulated area for the decontamination of employees and their equipment which is contaminated with asbestos which shall consist of an area covered by an impermeable drop cloth on the floor or horizontal working surface.

(ii) 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).

(iii) Work clothing must be cleaned with a HEPA vacuum before it is removed.

(iv) All equipment and surfaces of containers filled with ACM must be cleaned prior to removing them from the equipment room or area.

(v) The employer shall ensure that employees enter and exit the regulated area through the equipment room or area.

(3) *Requirements for Class IV work.* Employers shall ensure that employees performing Class IV work within a regulated area comply with the hygiene practice required of employees performing work which has a higher classification within that regulated area. Otherwise employers of employees cleaning up debris and material which is TSI or surfacing ACM or identified as PACM shall provide decontamination facilities for such employees which are required by paragraph (j)(2) of this section.

(4) *Smoking in work areas.* The employer shall ensure that employees do not smoke in work areas where they are occupationally exposed to asbestos because of activities in that work area.

(k) *Communication of hazards.* (1) This section applies to the communication of information concerning asbestos hazards in construction activities to

facilitate compliance with this standard. Most asbestos-related construction activities involve previously installed building materials. Building owners often are the only and/or best sources of information concerning them. Therefore, they, along with employers of potentially exposed employees, are assigned specific information conveying and retention duties under this section. Installed Asbestos Containing Building Material. Employers and building owners shall identify TSI and sprayed or troweled on surfacing materials in buildings as asbestos-containing, unless they determine in compliance with paragraph (k)(5) of this section that the material is not asbestos-containing. Asphalt and vinyl flooring material installed no later than 1980 must also be considered as asbestos containing unless the employer, pursuant to paragraph (g)(8)(i)(I) of this section determines that it is not asbestos-containing. If the employer/building owner has actual knowledge, or should have known through the exercise of due diligence, that other materials are asbestos-containing, they too must be treated as such. When communicating information to employees pursuant to this standard, owners and employers shall identify ''PACM'' as ACM. Additional requirements relating to communication of asbestos work on multi-employer worksites are set out in paragraph (d) of this section.

(2) *Duties of building and facility owners.* (i) Before work subject to this standard is begun, building and facility owners shall determine the presence, location, and quantity of ACM and/or PACM at the work site pursuant to paragraph (k)(1) of this section.

(ii) Building and/or facility owners shall notify the following persons of the presence, location and quantity of ACM or PACM, at the work sites in their buildings and facilities. Notification either shall be in writing, or shall consist of a personal communication between the owner and the person to whom notification must be given or their authorized representatives:

(A) Prospective employers applying or bidding for work whose employees reasonably can be expected to work in or adjacent to areas containing such material;

(B) Employees of the owner who will work in or adjacent to areas containing such material:

(C) On multi-employer worksites, all employers of employees who will be performing work within or adjacent to areas containing such materials;

(D) Tenants who will occupy areas containing such material.

(3) Duties of employers whose employees perform work subject to this standard in or adjacent to areas containing ACM and PACM. Building/facility owners whose employees perform such work shall comply with these provisions to the extent applicable.

(i) Before work in areas containing ACM and PACM is begun; employers shall identify the presence, location, and quantity of ACM, and/or PACM therein pursuant to paragraph (k)(1) of this section.

(ii) Before work under this standard is performed employers of employees who will perform such work shall inform the following persons of the location and quantity of ACM and/or PACM present in the area and the precautions to be taken to insure that airborne asbestos is confined to the area.

(A) Owners of the building/facility;

(B) Employees who will perform such work and employers of employees who work and/or will be working in adjacent areas.

(iii) Within 10 days of the completion of such work, the employer whose employees have performed work subject to this standard, shall inform the building/facility owner and employers of employees who will be working in the area of the current location and quantity of PACM and/or ACM remaining in the area and final monitoring results, if any.

(4) In addition to the above requirements, all employers who discover ACM and/or PACM on a worksite shall convey information concerning the presence, location and quantity of such newly discovered ACM and/or PACM to the owner and to other employers of employees working at the work site, within 24 hours of the discovery.

(5) Criteria to rebut the designation of installed material as PACM. (i) At any time, an employer and/or building

owner may demonstrate, for purposes of this standard, that PACM does not contain asbestos. Building owners and/or employers are not required to communicate information about the presence of building material for which such a demonstration pursuant to the requirements of paragraph (k)(5)(ii) of this section has been made. However, in all such cases, the information, data and analysis supporting the determination that PACM does not contain asbestos, shall be retained pursuant to paragraph (n) of this section.

(ii) An employer or owner may demonstrate that PACM does not contain more than 1% asbestos by the following: (A) Having a completed inspection conducted pursuant to the requirements of AHERA (40 CFR part 763, subpart E) which demonstrates that the material is not ACM; or

(B) Performing tests of the material containing PACM which demonstrate that no ACM is present in the material. Such tests shall include analysis of bulk samples collected in the manner described in 40 CFR 763.86. The tests, evaluation and sample collection shall be conducted by an accredited inspector or by a CIH. Analysis of samples shall be performed by persons or laboratories with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the National Voluntary Laboratory Accreditation Program (NVLAP) or the National Institute for Standards and Technology (NIST) or the Round Robin for bulk samples administered by the American Industrial Hygiene Association (AIHA) or an equivalent nationally-recognized round robin testing program.

(iii) The employer and/or building owner may demonstrate that flooring material including associated mastic and backing does not contain asbestos, by a determination of an industrial hygienist based upon recognized analytical techniques showing that the material is not ACM.

(6) At the entrance to mechanical rooms/areas in which employees reasonably can be expected to enter and which contain ACM and/or PACM, the building owner shall post signs which identify the material which is present, its location, and appropriate work practices which, if followed, will ensure that ACM and/or PACM will not be disturbed. The employer shall ensure, to the extent feasible, that employees who come in contact with these signs can comprehend them. Means to ensure employee comprehension may include the use of foreign languages, pictographs, graphics, and awareness training.

(7) *Signs.* (i) Warning signs that demarcate the regulated area shall be provided and displayed at each location where a regulated area is required to be established by paragraph (e) of this section. Signs shall be posted at such a distance from such a location that an employee may read the signs and take necessary protective steps before entering the area marked by the signs.

(ii) (A) The warning signs required by paragraph (k)(7) of this section shall bear the following information:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE
HAZARD
AUTHORIZED PERSONNEL ONLY

(B) In addition, where the use of respirators and protective clothing is required in the regulated area under this section, the warning signs shall include the following:

RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

(iii) The employer shall ensure that employees working in and contiguous to regulated areas comprehend the warning signs required to be posted by paragraph (k)(7)(i) of this section. Means to ensure employee comprehension may include the use of foreign languages, pictographs and graphics.

(8) *Labels.* (i) Labels shall be affixed to all products containing asbestos and to all containers containing such products, including waste containers. Where feasible, installed asbestos products shall contain a visible label.

(ii) Labels shall be printed in large, bold letters on a contrasting background.

(iii) Labels shall be used in accordance with the requirements of 29 CFR

1910.1200(f) of OSHA's Hazard Communication standard, and shall contain the following information:

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

(iv) [Reserved]

(v) Labels shall contain a warning statement against breathing asbestos fibers.

(vi) The provisions for labels required by paragraphs (k)(8)(i) through (k)(8)(iii) of this section do not apply where:

(A) Asbestos fibers have been modified by a bonding agent, coating, binder, or other material, provided that the manufacturer can demonstrate that, during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the permissible exposure limit and/or excursion limit will be released, or

(B) Asbestos is present in a product in concentrations less than 1.0 percent.

(vii) When a building owner or employer identifies previously installed PACM and/or ACM, labels or signs shall be affixed or posted so that employees will be notified of what materials contain PACM and/or ACM. The employer shall attach such labels in areas where they will clearly be noticed by employees who are likely to be exposed, such as at the entrance to mechanical room/areas. Signs required by paragraph (k)(6) of this section may be posted in lieu of labels so long as they contain information required for labelling. The employer shall ensure, to the extent feasible, that employees who come in contact with these signs or labels can comprehend them. Means to ensure employee comprehension may include the use of foreign languages, pictographs, graphics, and awareness training.

(9) *Employee Information and Training.* (i) The employer shall train each employee who is likely to be exposed in excess of a PEL, and each employee who performs Class I through IV asbestos operations, in accordance with the requirements of this section. Such training shall be conducted at no cost to the employee. The employer shall institute a training program and ensure employee participation in the program.

(ii) Training shall be provided prior to or at the time of initial assignment and at least annually thereafter.

(iii) Training for Class I operations and for Class II operations that require the use of critical barriers (or equivalent isolation methods) and/or negative pressure enclosures under this section shall be the equivalent in curriculum, training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement workers training (40 CFR part 763, subpart E, appendix C).

(iv) Training for other Class II work.

(A) For work with asbestos containing roofing materials, flooring materials, siding materials, ceiling tiles, or transite panels, training shall include at a minimum all the elements included in paragraph (k)(9)(viii) of this section and in addition, the specific work practices and engineering controls set forth in paragraph (g) of this section which specifically relate to that category. Such course shall include ''hands-on'' training and shall take at least 8 hours.

(B) An employee who works with more than one of the categories of material specified in paragraph (k)(9)(iv)(A) of this section shall receive training in the work practices applicable to each category of material that the employee removes and each removal method that the employee uses.

(C) For Class II operations not involving the categories of material specified in paragraph (k)(9)(iv)(A) of this section, training shall be provided which shall include at a minimum all the elements included in paragraph (k)(9)(viii) of this section and in addition, the specific work practices and engineering controls set forth in paragraph (g) of this section which specifically relate to the category of material being removed, and shall include ''hands-on'' training in the work practices applicable to each category of material that the employee removes and each removal method that the employee uses.

(v) Training for Class III employees shall be consistent with EPA requirements for training of local education

agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2). Such a course shall also include ''hands-on'' training and shall take at least 16 hours. Exception: For Class III operations for which the competent person determines that the EPA curriculum does not adequately cover the training needed to perform that activity, training shall include as a minimum all the elements included in paragraph (k)(9)(viii) of this section and in addition, the specific work practices and engineering controls set forth in paragraph (g) of this section which specifically relate to that activity, and shall include ''hands-on'' training in the work practices applicable to each category of material that the employee disturbs.

(vi) Training for employees performing Class IV operations shall be consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(1). Such a course shall include available information concerning the locations of thermal system insulation and surfacing ACM/PACM, and asbestos-containing flooring material, or flooring material where the absence of asbestos has not yet been certified; and instruction in recognition of damage, deterioration, and delamination of asbestos containing building materials. Such course shall take at least 2 hours.

(vii) Training for employees who are likely to be exposed in excess of the PEL and who are not otherwise required to be trained under paragraph (k)(9)(iii) through (vi) of this section, shall meet the requirements of paragraph (k)(9)(viii) of this section.

(viii) The training program shall be conducted in a manner that the employee is able to understand. In addition to the content required by provisions in paragraphs (k)(9)(iii) through (vi) of this section, the employer shall ensure that each such employee is informed of the following:

(A) Methods of recognizing asbestos, including the requirement in paragraph (k)(1) of this section to presume that certain building materials contain asbestos;

(B) The health effects associated with asbestos exposure;

(C) The relationship between smoking and asbestos in producing lung cancer;

(D) The nature of operations that could result in exposure to asbestos, the importance of necessary protective controls to minimize exposure including, as applicable, engineering controls, work practices, respirators, housekeeping procedures, hygiene facilities, protective clothing, decontamination procedures, emergency procedures, and waste disposal procedures, and any necessary instruction in the use of these controls and procedures; where Class III and IV work will be or is performed, the contents of EPA 20T–2003, ''Managing Asbestos In-Place'' July 1990 or its equivalent in content;

(E) The purpose, proper use, fitting instructions, and limitations of respirators as required by 29 CFR 1910.134;

(F) The appropriate work practices for performing the asbestos job;

(G) Medical surveillance program requirements;

(H) The content of this standard including appendices;

(I) The names, addresses and phone numbers of public health organizations which provide information, materials and/or conduct programs concerning smoking cessation. The employer may distribute the list of such organizations contained in appendix J to this section, to comply with this requirement; and

(J) The requirements for posting signs and affixing labels and the meaning of the required legends for such signs and labels.

(10) Access to training materials. (i) The employer shall make readily available to affected employees without cost, written materials relating to the employee training program, including a copy of this regulation.

(ii) The employer shall provide to the Assistant Secretary and the Director, upon request, all information and training materials relating to the employee information and training program.

(iii) The employer shall inform all employees concerning the availability of self-help smoking cessation program material. Upon employee request, the employer shall distribute such material, consisting of NIH Publication No,

89–1647, or equivalent self-help material, which is approved or published by a public health organization listed in appendix J to this section.

(l) *Housekeeping*—(1) *Vacuuming.* Where vacuuming methods are selected, HEPA filtered vacuuming equipment must be used. The equipment shall be used and emptied in a manner that minimizes the reentry of asbestos into the workplace.

(2) *Waste disposal.* Asbestos waste, scrap, debris, bags, containers, equipment, and contaminated clothing consigned for disposal shall be collected and disposed of in sealed, labeled, impermeable bags or other closed, labeled, impermeable containers except in roofing operations, where the procedures specified in paragraph (g)(8)(ii) of this section apply.

(3) *Care of asbestos-containing flooring material.* (i) All vinyl and asphalt flooring material shall be maintained in accordance with this paragraph unless the building/facility owner demonstrates, pursuant to paragraph (g)(8)(i)(I) of this section that the flooring does not contain asbestos.

(ii) Sanding of flooring material is prohibited.

(iii) Stripping of finishes shall be conducted using low abrasion pads at speeds lower than 300 rpm and wet methods.

(iv) Burnishing or dry buffing may be performed only on flooring which has sufficient finish so that the pad cannot contact the flooring material.

(4) Waste and debris and accompanying dust in an area containing accessible thermal system insulation or surfacing ACM/PACM or visibly deteriorated ACM:

(i) Shall not be dusted or swept dry, or vacuumed without using a HEPA filter;

(ii) Shall be promptly cleaned up and disposed of in leak tight containers.

(m) *Medical surveillance.* (1) General—(i) *Employees covered.* (A) The employer shall institute a medical surveillance program for all employees who for a combined total of 30 or more days per year are engaged in Class I, II and III work or are exposed at or above a permissible exposure limit. For purposes of this paragraph, any day in which a worker engages in Class II or Class III operations or a combination thereof on intact material for one hour or less (taking into account the entire time spent on the removal operation, including cleanup) and, while doing so, adheres fully to the work practices specified in this standard, shall not be counted.

(B) For employees otherwise required by this standard to wear a negative pressure respirator, employers shall ensure employees are physically able to perform the work and use the equipment. This determination shall be made under the supervision of a physician.

(ii) *Examination.* (A) The employer shall ensure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and are provided at no cost to the employee and at a reasonable time and place.

(B) Persons other than such licensed physicians who administer the pulmonary function testing required by this section shall complete a training course in spirometry sponsored by an appropriate academic or professional institution.

(2) *Medical examinations and consultations.* (i) Frequency. The employer shall make available medical examinations and consultations to each employee covered under paragraph (m)(1)(i) of this section on the following schedules:

(A) Prior to assignment of the employee to an area where negative-pressure respirators are worn;

(B) When the employee is assigned to an area where exposure to asbestos may be at or above the permissible exposure limit for 30 or more days per year, or engage in Class I, II, or III work for a combined total of 30 or more days per year, a medical examination must be given within 10 working days following the thirtieth day of exposure;

(C) And at least annually thereafter.

(D) If the examining physician determines that any of the examinations should be provided more frequently than specified, the employer shall provide such examinations to affected employees at the frequencies specified by the physician.

(E) Exception: No medical examination is required of any employee if adequate records show that the employee has been examined in accordance with this paragraph within the past 1-year period.

(ii) *Content.* Medical examinations made available pursuant to paragraphs (m)(2)(i)(A) through (m)(2)(i)(C) of this section shall include:

(A) A medical and work history with special emphasis directed to the pulmonary, cardiovascular, and gastrointestinal systems.

(B) On initial examination, the standardized questionnaire contained in part 1 of appendix D to this section, and, on annual examination, the abbreviated standardized questionnaire contained in part 2 of appendix D to this section.

(C) A physical examination directed to the pulmonary and gastrointestinal systems, including a chest roentgenogram to be administered at the discretion of the physician, and pulmonary function tests of forced vital capacity (FVC) and forced expiratory volume at one second (FEV(1)). Interpretation and classification of chest shall be conducted in accordance with appendix E to this section.

(D) Any other examinations or tests deemed necessary by the examining physician.

(3) *Information provided to the physician.* The employer shall provide the following information to the examining physician:

(i) A copy of this standard and Appendices D, E, and I to this section;

(ii) A description of the affected employee's duties as they relate to the employee's exposure;

(iii) The employee's representative exposure level or anticipated exposure level;

(iv) A description of any personal protective and respiratory equipment used or to be used; and

(v) Information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

(4) *Physician's written opinion.* (i) The employer shall obtain a written opinion from the examining physician. This written opinion shall contain the results of the medical examination and shall include:

(A) The physician's opinion as to 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.

(ii) 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.

(iii) The employer shall provide a copy of the physician's written opinion to the affected employee within 30 days from its receipt.

(n) *Recordkeeping.* (1) Objective data relied on pursuant to paragraph (f) to this section. (i) Where the employer has relied on objective data that demonstrates that products made from or containing asbestos or the activity involving such products or material are not capable of releasing fibers of asbestos in concentrations at or above the permissible exposure limit and/or excursion limit under the expected conditions of processing, use, or handling to satisfy the requirements of paragraph (f), the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

(ii) The record shall include at least the following information:

(A) The product qualifying for exemption;

(B) The source of the objective data;

(C) The testing protocol, results of testing, and/or analysis of the material for the release of asbestos;

(D) A description of the operation exempted and how the data support the exemption; and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(2) *Exposure measurements.* (i) The employer shall keep an accurate record of all measurements taken to monitor employee exposure to asbestos as prescribed in paragraph (f) of this section. NOTE: The employer may utilize the services of competent organizations such as industry trade associations and employee associations to maintain the records required by this section.

(ii) This record shall include at least the following information:

(A) The date of measurement;

(B) The operation involving exposure to asbestos that is being monitored;

(C) Sampling and analytical methods used and evidence of their accuracy;

(D) Number, duration, and results of samples taken;

(E) Type of protective devices worn, if any; and

(F) Name, social security number, and exposure of the employees whose exposures are represented.

(iii) The employer shall maintain this record for at least thirty (30) years, in accordance with 29 CFR 1910.33.

(3) *Medical surveillance.* (i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance by paragraph (m) of this section, in accordance with 29 CFR 1910.33.

(ii) The record shall include at least the following information:

(A) The name and social security number of the employee;

(B) A copy of the employee's medical examination results, including the medical history, questionnaire responses, results of any tests, and physician's recommendations.

(C) Physician's written opinions;

(D) Any employee medical complaints related to exposure to asbestos; and

(E) A copy of the information provided to the physician as required by paragraph (m) of this section.

(iii) The employer shall ensure that this record is maintained for the duration of employment plus thirty (30) years, in accordance with 29 CFR 1910.33.

(4) *Training records.* The employer shall maintain all employee training records for one (1) year beyond the last date of employment by that employer.

(5) *Data to Rebut PACM.* Where the building owner and employer have relied on data to demonstrate that PACM is not asbestos-containing, such data shall be maintained for as long as they are relied upon to rebut the presumption.

(6) *Records of required notifications.* Where the building owner has communicated and received information concerning the identification, location and quantity of ACM and PACM, written records of such notifications and their content shall be maintained by the building owner for the duration of ownership and shall be transferred to successive owners of such buildings/facilities.

(7) *Availability.* (i) The employer, upon written request, shall make all records required to be maintained by this section available to the Assistant Secretary and the Director for examination and copying.

(ii) The employer, upon request, shall make any exposure records required by paragraphs (f) and (n) of this section available for examination and copying to affected employees, former employees, designated representatives, and the Assistant Secretary, in accordance with 29 CFR 1910.33(a) through (e) and (g) through (i).

(iii) The employer, upon request, shall make employee medical records required by paragraphs (m) and (n) of this section available for examination and copying to the subject employee, anyone having the specific written consent of the subject employee, and the Assistant Secretary, in accordance with 29 CFR 1910.33.

(8) *Transfer of records.* (i) The employer shall comply with the requirements concerning transfer of records set forth in 29 CFR 1910.33(h).

(ii) Whenever the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the

employer shall notify the Director at least 90 days prior to disposal and, upon request, transmit them to the Director.

(o) *Competent person.* (1) General. On all construction worksites covered by this standard, the employer shall designate a competent person, having the qualifications and authorities for ensuring worker safety and health required by subpart C, General Safety and Health Provisions for Construction (29 CFR 1926.20 through 1926.32).

(2) *Required inspections by the competent person.* Section 1926.20(b)(2) which requires health and safety prevention programs to provide for frequent and regular inspections of the job sites, materials, and equipment to be made by competent persons, is incorporated.

(3) *Additional inspections.* In addition, the competent person shall make frequent and regular inspections of the job sites, in order to perform the duties set out below in paragraph (o)(3)(i) of this section. For Class I jobs, on-site inspections shall be made at least once during each work shift, and at any time at employee request. For Class II, III, and IV jobs, on-site inspections shall be made at intervals sufficient to assess whether conditions have changed, and at any reasonable time at employee request.

(i) On all worksites where employees are engaged in Class I or II asbestos work, the competent person designated in accordance with paragraph (e)(6) of this section shall perform or supervise the following duties, as applicable:

(A) Set up the regulated area, enclosure, or other containment;

(B) Ensure (by on-site inspection) the integrity of the enclosure or containment;

(C) Set up procedures to control entry to and exit from the enclosure and/or area;

(D) Supervise all employee exposure monitoring required by this section and ensure that it is conducted as required by paragraph (f) of this section;

(E) Ensure that employees working within the enclosure and/or using glove bags wear respirators and protective clothing as required by paragraphs (h) and (i) of this section;

(F) Ensure through on-site supervision, that employees set up, use, and remove engineering controls, use work practices and personal protective equipment in compliance with all requirements;

(G) Ensure that employees use the hygiene facilities and observe the decontamination procedures specified in paragraph (j) of this section;

(H) Ensure that through on-site inspection, engineering controls are functioning properly and employees are using proper work practices; and,

(I) Ensure that notification requirement in paragraph (k) of this section are met.

(ii) [Reserved]

(4) *Training for the competent person.* (i) For Class I and II asbestos work the competent person shall be trained in all aspects of asbestos removal and handling, including: abatement, installation, removal and handling; the contents of this standard; the identification of asbestos; removal procedures, where appropriate; and other practices for reducing the hazard. Such training shall be obtained in a comprehensive course for supervisors that meets the criteria of EPA's Model Accreditation Plan (40 CFR part 763, subpart E, appendix C), such as a course conducted by an EPA-approved or state-approved training provider, certified by EPA or a state, or a course equivalent in stringency, content, and length.

(ii) For Class III and IV asbestos work, the competent person shall be trained in aspects of asbestos handling appropriate for the nature of the work, to include procedures for setting up glove bags and mini-enclosures, practices for reducing asbestos exposures, use of wet methods, the contents of this standard, and the identification of asbestos. Such training shall include successful completion of a course that is consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2), or its equivalent in stringency, content and length. Competent persons for Class III and IV work, may also be trained pursuant to the requirements of paragraph (o)(4)(i) of this section.

(p) *Appendices.* (1) Appendices A, C, D, and E to this section are incorporated

as part of this section and the contents of these appendices are mandatory.

(2) Appendices B, F, H, I, J, and K to this section are informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

APPENDIX A TO § 1926.1101—OSHA REFERENCE METHOD—MANDATORY

This mandatory appendix specifies the procedure for analyzing air samples for asbestos and specifies quality control procedures that must be implemented by laboratories performing the analysis. The sampling and analytical methods described below represent the elements of the available monitoring methods (such as appendix B of this regulation, the most current version of the OSHA method ID–160, or the most current version of the NIOSH Method 7400). All employers who are required to conduct air monitoring under paragraph (f) of the standard are required to utilize analytical laboratories that use this procedure, or an equivalent method, for collecting and analyzing samples.

Sampling and Analytical Procedure

1. The sampling medium for air samples shall be mixed cellulose ester filter membranes. These shall be designated by the manufacturer as suitable for asbestos counting. See below for rejection of blanks.

2. The preferred collection device shall be the 25-mm diameter cassette with an open-faced 50-mm electrically conductive extension cowl. The 37-mm cassette may be used if necessary but only if written justification for the need to use the 37-mm filter cassette accompanies the sample results in the employee's exposure monitoring record. Do not reuse or reload cassettes for asbestos sample collection.

3. An air flow rate between 0.5 liter/min and 2.5 liters/min shall be selected for the 25/mm cassette. If the 37-mm cassette is used, an air flow rate between 1 liter/min and 2.5 liters/min shall be selected.

4. Where possible, a sufficient air volume for each air sample shall be collected to yield between 100 and 1,300 fibers per square millimeter on the membrane filter. If a filter darkens in appearance or if loose dust is seen on the filter, a second sample shall be started.

5. Ship the samples in a rigid container with sufficient packing material to prevent dislodging the collected fibers. Packing material that has a high electrostatic charge on its surface (e.g., expanded polystyrene) cannot be used because such material can cause loss of fibers to the sides of the cassette.

6. Calibrate each personal sampling pump before and after use with a representative filter cassette installed between the pump and the calibration devices.

7. Personal samples shall be taken in the ''breathing zone'' of the employee (i.e., attached to or near the collar or lapel near the worker's face).

8. Fiber counts shall be made by positive phase contrast using a microscope with an 8 to 10 X eyepiece and a 40 to 45 X objective for a total magnification of approximately 400 X and a numerical aperture of 0.65 to 0.75. The microscope shall also be fitted with a green or blue filter.

9. The microscope shall be fitted with a Walton-Beckett eyepiece graticule calibrated for a field diameter of 100 micrometers (±2 micrometers).

10. The phase-shift detection limit of the microscope shall be about 3 degrees measured using the HSE phase shift test slide as outlined below.

a. Place the test slide on the microscope stage and center it under the phase objective.

b. Bring the blocks of grooved lines into focus.

NOTE: The slide consists of seven sets of grooved lines (ca. 20 grooves to each block) in descending order of visibility from sets 1 to 7, seven being the least visible. The requirements for asbestos counting are that the microscope optics must resolve the groooved lines in set 3 completely, although they may appear somewhat faint, and that the grooved lines in sets 6 and 7 must be invisible. Sets 4 and 5 must be at least partially visible but may vary slightly in visibility between microscopes. A microscope that fails to meet these requirements has either too low or too high a resolution to be used for asbestos counting.

c. If the image deteriorates, clean and adjust the microscope optics. If the problem persists, cosult the microscope manufacturer.

11. Each set of samples taken will include 10% field blanks or a minimum of 2 field blanks. These blanks must come from the same lot as the filters used for sample collection. The field blank results shall be averaged and subtracted from the analytical results before reporting. A set consists of any sample or group of samples for which an evaluation for this standard must be made. Any samples represented by a field blank having a fiber count in excess of the detection limit of the method being used shall be rejected.

12. The samples shall be mounted by the acetone/triacetin method or a method with an equivalent index of refraction and similar clarity.

13. Observe the following counting rules.

a. Count only fibers equal to or longer than 5 micrometers. Measure the length of curved fibers along the curve.

b. In the absence of other information, count all particles as asbestos, that have a length-to-width ratio (aspect ratio) of 3:1 or greater.

c. Fibers lying entirely within the boundary of the Walton-Beckett graticule field shall receive a count of 1. Fibers crossing the boundary once, having one end within the circle, shall receive the count of one half (½). Do not count any fiber that crosses the graticule boundary more than once. Reject and do not count any other fibers even though they may be visible outside the graticule area.

d. Count bundles of fibers as one fiber unless individual fibers can be identified by observing both ends of an individual fiber.

e. Count enough graticule fields to yield 100 fibers. Count a minimum of 20 fields; stop counting at 100 fields regardless of fiber count.

14. Blind recounts shall be conducted at the rate of 10 percent.

Quality Control Procedures

1. Intralaboratory program. Each laboratory and/or each company with more than one microscopist counting slides shall establish a statistically designed quality assurance program involving blind recounts and comparisons between microscopists to monitor the variability of counting by each microscopist and between microscopists. In a company with more than one laboratory, the program shall include all laboratories, and shall also evaluate the laboratory-to-laboratory variability.

2a. Interlaboratory program. Each laboratory analyzing asbestos samples for compliance determination shall implement an interlaboratory quality assurance program that, as a minimum, includes participation of at least two other independent laboratories. Each laboratory shall participate in round robin testing at least once every 6 months with at least all the other laboratories in its interlaboratory quality assurance group. Each laboratory shall submit slides typical of its own workload for use in this program. The round robin shall be designed and results analyzed using appropriate statistical methodology.

b. All laboratories should also participate in a national sample testing scheme such as the Proficiency Analytical Testing Program (PAT), or the Asbestos Registry sponsored by the American Industrial Hygiene Association (AIHA).

3. All individuals performing asbestos analysis must have taken the NIOSH course for sampling and evaluating airborne asbestos dust or an equivalent course.

4. When the use of different microscopes contributes to differences between counters and laboratories, the effect of the different microscope shall be evaluated and the microscope shall be replaced, as necessary.

5. Current results of these quality assurance programs shall be posted in each laboratory to keep the microscopists informed.

APPENDIX B TO §1926.1101—SAMPLING AND ANALYSIS (NON-MANDATORY)

Matrix Air:	
OSHA Permissible Exposure Limits:	
Time Weighted Average	0.1 fiber/cc
Excursion Level (30 minutes)	1.0 fiber/cc
Collection Procedure:	
A known volume of air is drawn through a 25-mm diameter cassette containing a mixed-cellulose ester filter. The cassette must be equipped with an electrically conductive 50-mm extension cowl. The sampling time and rate are chosen to give a fiber density of between 100 to 1,300 fibers/mm2 on the filter.	
Recommended Sampling Rate	0.5 to 5.0 liters/minute (L/min)
Recommended Air Volumes:	
Minimum	25 L
Maximum	2,400 L

Analytical Procedure:

A portion of the sample filter is cleared and prepared for asbestos fiber counting by Phase Contrast Microscopy (PCM) at 400X.

Commercial manufacturers and products mentioned in this method are for descriptive use only and do not constitute endorsements by USDOL-OSHA. Similar products from other sources can be substituted.

1. Introduction

This method describes the collection of airborne asbestos fibers using calibrated sampling pumps with mixed-cellulose ester (MCE) filters and analysis by phase contrast microscopy (PCM). Some terms used are unique to this method and are defined below: *Asbestos:* A term for naturally occurring fibrous minerals. Asbestos includes chrysotile, crocidolite, amosite (cummingtonite-

grunerite asbestos), tremolite asbestos, actinolite asbestos, anthophyllite asbestos, and any of these minerals that have been chemically treated and/or altered. The precise chemical formulation of each species will vary with the location from which it was mined. Nominal compositions are listed:

Chrysotile	$Mg_3\ Si_2\ O_5(OH)_4$
Crocidolite	$Na_2\ Fe_3^{2+}\ Fe_2^{3+}\ Si_8\ O_{22}(OH)_2$
Amosite	$(Mg,Fe)_7\ Si_8\ O_{22}(OH)_2$
Tremolite-actinolite	$Ca_2(Mg,Fe)_5\ Si_8\ O_{22}(OH)_2$
Anthophyllite	$(Mg,Fe)_7\ Si_8\ O_{22}(OH)_2$

Asbestos Fiber: A fiber of asbestos which meets the criteria specified below for a fiber.

Aspect Ratio: The ratio of the length of a fiber to it's diameter (e.g. 3:1, 5:1 aspect ratios).

Cleavage Fragments: Mineral particles formed by comminution of minerals, especially those characterized by parallel sides and a moderate aspect ratio (usually less than 20:1).

Detection Limit: The number of fibers necessary to be 95% certain that the result is greater than zero.

Differential Counting: The term applied to the practice of excluding certain kinds of fibers from the fiber count because they do not appear to be asbestos.

Fiber: A particle that is 5 μm or longer, with a length-to-width ratio of 3 to 1 or longer.

Field: The area within the graticule circle that is superimposed on the microscope image.

Set: The samples which are taken, submitted to the laboratory, analyzed, and for which, interim or final result reports are generated.

Tremolite, Anthophyllite, and Actinolite: The non-asbestos form of these minerals which meet the definition of a fiber. It includes any of these minerals that have been chemically treated and/or altered.

Walton-Beckett Graticule: An eyepiece graticule specifically designed for asbestos fiber counting. It consists of a circle with a projected diameter of 100 ±2 μm (area of about 0.00785 mm^2) with a crosshair having tic-marks at 3-μm intervals in one direction and 5-μm in the orthogonal direction. There are marks around the periphery of the circle to demonstrate the proper sizes and shapes of fibers. This design is reproduced in Figure 1. The disk is placed in one of the microscope eyepieces so that the design is superimposed on the field of view.

1.1. History

Early surveys to determine asbestos exposures were conducted using impinger counts of total dust with the counts expressed as million particles per cubic foot. The British Asbestos Research Council recommended filter membrane counting in 1969. In July 1969, the Bureau of Occupational Safety and Health published a filter membrane method for counting asbestos fibers in the United States. This method was refined by NIOSH and published as P & CAM 239. On May 29, 1971, OSHA specified filter membrane sampling with phase contrast counting for evaluation of asbestos exposures at work sites in the United States. The use of this technique was again required by OSHA in 1986. Phase contrast microscopy has continued to be the method of choice for the measurement of occupational exposure to asbestos.

1.2. Principle

Air is drawn through a MCE filter to capture airborne asbestos fibers. A wedge shaped portion of the filter is removed, placed on a glass microscope slide and made transparent. A measured area (field) is viewed by PCM. All the fibers meeting defined criteria for asbestos are counted and considered a measure of the airborne asbestos concentration.

1.3. Advantages and Disadvantages

There are four main advantages of PCM over other methods:

(1) The technique is specific for fibers. Phase contrast is a fiber counting technique which excludes non-fibrous particles from the analysis.

(2) The technique is inexpensive and does not require specialized knowledge to carry out the analysis for total fiber counts.

(3) The analysis is quick and can be performed on-site for rapid determination of air concentrations of asbestos fibers.

(4) The technique has continuity with historical epidemiological studies so that estimates of expected disease can be inferred from long-term determinations of asbestos exposures.

The main disadvantage of PCM is that it does not positively identify asbestos fibers. Other fibers which are not asbestos may be included in the count unless differential counting is performed. This requires a great deal of experience to adequately differentiate asbestos from non-asbestos fibers. Positive identification of asbestos must be performed by polarized light or electron microscopy techniques. A further disadvantage of PCM is that the smallest visible fibers are about 0.2 μm in diameter while the finest asbestos fibers may be as small as 0.02 μm in diameter. For some exposures, substantially more fibers may be present than are actually counted.

1.4. Workplace Exposure

Asbestos is used by the construction industry in such products as shingles, floor tiles, asbestos cement, roofing felts, insulation and acoustical products. Non-construction uses include brakes, clutch facings, paper,

paints, plastics, and fabrics. One of the most significant exposures in the workplace is the removal and encapsulation of asbestos in schools, public buildings, and homes. Many workers have the potential to be exposed to asbestos during these operations.

About 95% of the asbestos in commercial use in the United States is chrysotile. Crocidolite and amosite make up most of the remainder. Anthophyllite and tremolite or actinolite are likely to be encountered as contaminants in various industrial products.

1.5. Physical Properties

Asbestos fiber possesses a high tensile strength along its axis, is chemically inert, non-combustible, and heat resistant. It has a high electrical resistance and good sound absorbing properties. It can be weaved into cables, fabrics or other textiles, and also matted into asbestos papers, felts, or mats.

2. Range and Detection Limit

2.1. The ideal counting range on the filter is 100 to 1,300 fibers/mm^2. With a Walton-Beckett graticule this range is equivalent to 0.8 to 10 fibers/field. Using NIOSH counting statistics, a count of 0.8 fibers/field would give an approximate coefficient of variation (CV) of 0.13.

2.2. The detection limit for this method is 4.0 fibers per 100 fields or 5.5 fibers/mm^2. This was determined using an equation to estimate the maximum CV possible at a specific concentration (95% confidence) and a Lower Control Limit of zero. The CV value was then used to determine a corresponding concentration from historical CV vs fiber relationships. As an example:

Lower Control Limit (95% Confidence) = AC—1.645(CV)(AC)

Where:

AC = Estimate of the airborne fiber concentration (fibers/cc) Setting the Lower Control Limit=0 and solving for CV:

0 = AC—1.645(CV)(AC)

CV = 0.61

This value was compared with CV vs. count curves. The count at which CV = 0.61 for Leidel-Busch counting statistics or for an OSHA Salt Lake Technical Center (OSHA-SLTC) CV curve (see appendix A for further information) was 4.4 fibers or 3.9 fibers per 100 fields, respectively. Although a lower detection limit of 4 fibers per 100 fields is supported by the OSHA-SLTC data, both data sets support the 4.5 fibers per 100 fields value.

3. Method Performance—Precision and Accuracy

Precision is dependent upon the total number of fibers counted and the uniformity of the fiber distribution on the filter. A general rule is to count at least 20 and not more than 100 fields. The count is discontinued when 100 fibers are counted, provided that 20 fields have already been counted. Counting more than 100 fibers results in only a small gain in precision. As the total count drops below 10 fibers, an accelerated loss of precision is noted.

At this time, there is no known method to determine the absolute accuracy of the asbestos analysis. Results of samples prepared through the Proficiency Analytical Testing (PAT) Program and analyzed by the OSHA-SLTC showed no significant bias when compared to PAT reference values. The PAT samples were analyzed from 1987 to 1989 (N=36) and the concentration range was from 120 to 1,300 fibers/mm^2.

4. Interferences

Fibrous substances, if present, may interfere with asbestos analysis.

Some common fibers are:

fiberglass
anhydrite
plant fibers
perlite veins
gypsum
some synthetic fibers
membrane structures
sponge spicules
diatoms
microorganisms
wollastonite

The use of electron microscopy or optical tests such as polarized light, and dispersion staining may be used to differentiate these materials from asbestos when necessary.

5. Sampling

5.1. Equipment

5.1.1. Sample assembly (The assembly is shown in Figure 3). Conductive filter holder consisting of a 25-mm diameter, 3-piece cassette having a 50-mm long electrically conductive extension cowl. Backup pad, 25-mm, cellulose. Membrane filter, mixed-cellulose ester (MCE), 25-mm, plain, white, 0.4 to 1.2-μm pore size.

NOTES:

(a) DO NOT RE-USE CASSETTES.

(b) Fully conductive cassettes are required to reduce fiber loss to the sides of the cassette due to electrostatic attraction.

(c) Purchase filters which have been selected by the manufacturer for asbestos counting or analyze representative filters for fiber background before use. Discard the filter lot if more than 4 fibers/100 fields are found.

(d) To decrease the possibility of contamination, the sampling system (filter-backup pad-cassette) for asbestos is usually preassembled by the manufacturer.

(e) Other cassettes, such as the Bell-mouth, may be used within the limits of their validation.

5.1.2. Gel bands for sealing cassettes.

5.1.3. Sampling pump.

Each pump must be a battery operated, self-contained unit small enough to be placed on the monitored employee and not interfere with the work being performed. The pump must be capable of sampling at the collection rate for the required sampling time.

5.1.4. Flexible tubing, 6-mm bore.

5.1.5. Pump calibration.

Stopwatch and bubble tube/burette or electronic meter.

5.2. Sampling Procedure

5.2.1. Seal the point where the base and cowl of each cassette meet with a gel band or tape.

5.2.2. Charge the pumps completely before beginning.

5.2.3. Connect each pump to a calibration cassette with an appropriate length of 6-mm bore plastic tubing. Do not use luer connectors—the type of cassette specified above has built-in adapters.

5.2.4. Select an appropriate flow rate for the situation being monitored. The sampling flow rate must be between 0.5 and 5.0 L/min for personal sampling and is commonly set between 1 and 2 L/min. Always choose a flow rate that will not produce overloaded filters.

5.2.5. Calibrate each sampling pump before and after sampling with a calibration cassette in-line (Note: This calibration cassette should be from the same lot of cassettes used for sampling). Use a primary standard (e.g. bubble burette) to calibrate each pump. If possible, calibrate at the sampling site.

NOTE: If sampling site calibration is not possible, environmental influences may affect the flow rate. The extent is dependent on the type of pump used. Consult with the pump manufacturer to determine dependence on environmental influences. If the pump is affected by temperature and pressure changes, correct the flow rate using the formula shown in the section ''Sampling Pump Flow Rate Corrections'' at the end of this appendix.

5.2.6. Connect each pump to the base of each sampling cassette with flexible tubing. Remove the end cap of each cassette and take each air sample open face. Assure that each sample cassette is held open side down in the employee's breathing zone during sampling. The distance from the nose/mouth of the employee to the cassette should be about 10 cm. Secure the cassette on the collar or lapel of the employee using spring clips or other similar devices.

5.2.7. A suggested minimum air volume when sampling to determine TWA compliance is 25 L. For Excursion Limit (30 min sampling time) evaluations, a minimum air volume of 48 L is recommended.

5.2.8. The most significant problem when sampling for asbestos is overloading the filter with non-asbestos dust. Suggested maximum air sample volumes for specific environments are:

Environment	Air Vol. (L)
Asbestos removal operations (visible dust).	100.
Asbestos removal operations (little dust).	240.
Office environments	400 to 2,400.

CAUTION: Do not overload the filter with dust. High levels of non-fibrous dust particles may obscure fibers on the filter and lower the count or make counting impossible. If more than about 25 to 30% of the field area is obscured with dust, the result may be biased low. Smaller air volumes may be necessary when there is excessive non-asbestos dust in the air.

While sampling, observe the filter with a small flashlight. If there is a visible layer of dust on the filter, stop sampling, remove and seal the cassette, and replace with a new sampling assembly. The total dust loading should not exceed 1 mg.

5.2.9. Blank samples are used to determine if any contamination has occurred during sample handling. Prepare two blanks for the first 1 to 20 samples. For sets containing greater than 20 samples, prepare blanks as 10% of the samples. Handle blank samples in the same manner as air samples with one exception: Do not draw any air through the blank samples. Open the blank cassette in the place where the sample cassettes are mounted on the employee. Hold it open for about 30 seconds. Close and seal the cassette appropriately. Store blanks for shipment with the sample cassettes.

5.2.10. Immediately after sampling, close and seal each cassette with the base and plastic plugs. Do not touch or puncture the filter membrane as this will invalidate the analysis.

5.2.11 Attach and secure a sample seal around each sample cassette in such a way as to assure that the end cap and base plugs cannot be removed without destroying the seal. Tape the ends of the seal together since the seal is not long enough to be wrapped end-to-end. Also wrap tape around the cassette at each joint to keep the seal secure.

5.3.1. Send the samples to the laboratory with paperwork requesting asbestos analysis. List any known fibrous interferences present during sampling on the paperwork. Also, note the workplace operation(s) sampled.

5.3.2. Secure and handle the samples in such that they will not rattle during shipment nor be exposed to static electricity. Do not ship samples in expanded polystyrene peanuts, vermiculite, paper shreds, or excelsior. Tape sample cassettes to sheet bubbles and place in a container that will cushion the samples in such a manner that they will not rattle.

5.3.3. To avoid the possibility of sample contamination, always ship bulk samples in separate mailing containers.

6. Analysis

6.1. Safety Precautions

6.1.1. Acetone is extremely flammable and precautions must be taken not to ignite it. Avoid using large containers or quantities of acetone. Transfer the solvent in a ventilated laboratory hood. Do not use acetone near any open flame. For generation of acetone vapor, use a spark free heat source.

6.1.2. Any asbestos spills should be cleaned up immediately to prevent dispersal of fibers. Prudence should be exercised to avoid contamination of laboratory facilities or exposure of personnel to asbestos. Asbestos spills should be cleaned up with wet methods and/or a High Efficiency Particulate-Air (HEPA) filtered vacuum.

CAUTION: Do not use a vacuum without a HEPA filter—It will disperse fine asbestos fibers in the air.

6.2. Equipment

6.2.1. Phase contrast microscope with binocular or trinocular head.

6.2.2. Widefield or Huygenian 10X eyepieces (NOTE: The eyepiece containing the graticule must be a focusing eyepiece. Use a 40X phase objective with a numerical aperture of 0.65 to 0.75).

6.2.3. Kohler illumination (if possible) with green or blue filter.

6.2.4. Walton-Beckett Graticule, type G–22 with 100 ±2 μm projected diameter.

6.2.5. Mechanical stage. A rotating mechanical stage is convenient for use with polarized light.

6.2.6. Phase telescope.

6.2.7. Stage micrometer with 0.01-mm subdivisions.

6.2.8. Phase-shift test slide, mark II (Available from PTR optics Ltd., and also McCrone).

6.2.9. Precleaned glass slides, 25 mm×75 mm. One end can be frosted for convenience in writing sample numbers, etc., or paste-on labels can be used.

6.2.10. Cover glass #1½.

6.2.11. Scalpel (#10, curved blade).

6.2.12. Fine tipped forceps.

6.2.13. Aluminum block for clearing filter (see appendix D and Figure 4).

6.2.14. Automatic adjustable pipette, 100- to 500-μL.

6.2.15. Micropipette, 5 μL.

6.3. Reagents

6.3.1. Acetone (HPLC grade).

6.3.2. Triacetin (glycerol triacetate).

6.3.3. Lacquer or nail polish.

6.4. Standard Preparation

A way to prepare standard asbestos samples of known concentration has not been developed. It is possible to prepare replicate samples of nearly equal concentration. This has been performed through the PAT program. These asbestos samples are distributed by the AIHA to participating laboratories.

Since only about one-fourth of a 25-mm sample membrane is required for an asbestos count, any PAT sample can serve as a ''standard'' for replicate counting.

6.5. Sample Mounting

NOTE: See Safety Precautions in Section 6.1. before proceeding. The objective is to produce samples with a smooth (non-grainy) background in a medium with a refractive index of approximately 1.46. The technique below collapses the filter for easier focusing and produces permanent mounts which are useful for quality control and interlaboratory comparison.

An aluminum block or similar device is required for sample preparation.

6.5.1. Heat the aluminum block to about 70 °C. The hot block should not be used on any surface that can be damaged by either the heat or from exposure to acetone.

6.5.2. Ensure that the glass slides and cover glasses are free of dust and fibers.

6.5.3. Remove the top plug to prevent a vacuum when the cassette is opened. Clean the outside of the cassette if necessary. Cut the seal and/or tape on the cassette with a razor blade. Very carefully separate the base from the extension cowl, leaving the filter and backup pad in the base.

6.5.4. With a rocking motion cut a triangular wedge from the filter using the scalpel. This wedge should be one-sixth to one-fourth of the filter. Grasp the filter wedge with the forceps on the perimeter of the filter which was clamped between the cassette pieces. DO NOT TOUCH the filter with your finger. Place the filter on the glass slide sample side up. Static electricity will usually keep the filter on the slide until it is cleared.

6.5.5. Place the tip of the micropipette containing about 200 μL acetone into the aluminum block. Insert the glass slide into the receiving slot in the aluminum block. Inject the acetone into the block with slow, steady pressure on the plunger while holding the pipette firmly in place. Wait 3 to 5 seconds for the filter to clear, then remove the pipette and slide from the aluminum block.

6.5.6. Immediately (less than 30 seconds) place 2.5 to 3.5 μL of triacetin on the filter (NOTE: Waiting longer than 30 seconds will result in increased index of refraction and decreased contrast between the fibers and the preparation. This may also lead to separation of the cover slip from the slide).

6.5.7. Lower a cover slip gently onto the filter at a slight angle to reduce the possibility of forming air bubbles. If more than 30 seconds have elapsed between acetone exposure and triacetin application, glue the edges of the cover slip to the slide with lacquer or nail polish.

6.5.8. If clearing is slow, warm the slide for 15 min on a hot plate having a surface temperature of about 50 °C to hasten clearing. The top of the hot block can be used if the slide is not heated too long.

6.5.9. Counting may proceed immediately after clearing and mounting are completed.

6.6. Sample Analysis

Completely align the microscope according to the manufacturer's instructions. Then, align the microscope using the following general alignment routine at the beginning of every counting session and more often if necessary.

6.6.1. Alignment

(1) Clean all optical surfaces. Even a small amount of dirt can significantly degrade the image.

(2) Rough focus the objective on a sample.

(3) Close down the field iris so that it is visible in the field of view. Focus the image of the iris with the condenser focus. Center the image of the iris in the field of view.

(4) Install the phase telescope and focus on the phase rings. Critically center the rings. Misalignment of the rings results in astigmatism which will degrade the image.

(5) Place the phase-shift test slide on the microscope stage and focus on the lines. The analyst must see line set 3 and should see at least parts of 4 and 5 but, not see line set 6 or 6. A microscope/microscopist combination which does not pass this test may not be used.

6.6.2. Counting Fibers

(1) Place the prepared sample slide on the mechanical stage of the microscope. Position the center of the wedge under the objective lens and focus upon the sample.

(2) Start counting from one end of the wedge and progress along a radial line to the other end (count in either direction from perimeter to wedge tip). Select fields randomly, without looking into the eyepieces, by slightly advancing the slide in one direction with the mechanical stage control.

(3) Continually scan over a range of focal planes (generally the upper 10 to 15 μm of the filter surface) with the fine focus control during each field count. Spend at least 5 to 15 seconds per field.

(4) Most samples will contain asbestos fibers with fiber diameters less than 1 μm. Look carefully for faint fiber images. The small diameter fibers will be very hard to see. However, they are an important contribution to the total count.

(5) Count only fibers equal to or longer than 5 μm. Measure the length of curved fibers along the curve.

(6) Count fibers which have a length to width ratio of 3:1 or greater.

(7) Count all the fibers in at least 20 fields. Continue counting until either 100 fibers are counted or 100 fields have been viewed; whichever occurs first. Count all the fibers in the final field.

(8) Fibers lying entirely within the boundary of the Walton-Beckett graticule field shall receive a count of 1. Fibers crossing the boundary once, having one end within the circle shall receive a count of ½. Do not count any fiber that crosses the graticule boundary more than once. Reject and do not count any other fibers even though they may be visible outside the graticule area. If a fiber touches the circle, it is considered to cross the line.

(9) Count bundles of fibers as one fiber unless individual fibers can be clearly identified and each individual fiber is clearly not connected to another counted fiber. See Figure 1 for counting conventions.

(10) Record the number of fibers in each field in a consistent way such that filter non-uniformity can be assessed.

(11) Regularly check phase ring alignment.

(12) When an agglomerate (mass of material) covers more than 25% of the field of view, reject the field and select another. Do not include it in the number of fields counted.

(13) Perform a ''blind recount'' of 1 in every 10 filter wedges (slides). Re-label the slides using a person other than the original counter.

6.7. Fiber Identification

As previously mentioned in Section 1.3., PCM does not provide positive confirmation of asbestos fibers. Alternate differential counting techniques should be used if discrimination is desirable. Differential counting may include primary discrimination based on morphology, polarized light analysis of fibers, or modification of PCM data by Scanning Electron or Transmission Electron Microscopy.

A great deal of experience is required to routinely and correctly perform differential counting. It is discouraged unless it is legally necessary. Then, only if a fiber is obviously not asbestos should it be excluded from the count. Further discussion of this technique can be found in reference 8.10.

If there is a question whether a fiber is asbestos or not, follow the rule:

''WHEN IN DOUBT, COUNT.''

6.8. Analytical Recommendations—Quality Control System

6.8.1. All individuals performing asbestos analysis must have taken the NIOSH course

for sampling and evaluating airborne asbestos or an equivalent course.

6.8.2. Each laboratory engaged in asbestos counting shall set up a slide trading arrangement with at least two other laboratories in order to compare performance and eliminate inbreeding of error. The slide exchange occurs at least semiannually. The round robin results shall be posted where all analysts can view individual analyst's results.

6.8.3. Each laboratory engaged in asbestos counting shall participate in the Proficiency Analytical Testing Program, the Asbestos Analyst Registry or equivalent.

6.8.4. Each analyst shall select and count prepared slides from a ''slide bank''. These are quality assurance counts. The slide bank shall be prepared using uniformly distributed samples taken from the workload. Fiber densities should cover the entire range routinely analyzed by the laboratory. These slides are counted blind by all counters to establish an original standard deviation. This historical distribution is compared with the quality assurance counts. A counter must have 95% of all quality control samples counted within three standard deviations of the historical mean. This count is then integrated into a new historical mean and standard deviation for the slide.

The analyses done by the counters to establish the slide bank may be used for an interim quality control program if the data are treated in a proper statistical fashion.

7. Calculations

7.1. Calculate the estimated airborne asbestos fiber concentration on the filter sample using the following formula:

$$AC = \frac{\left[\left(\frac{FB}{FL}\right) - \left(\frac{BFB}{BFL}\right)\right] \times ECA}{1000 \times FR \times T \times MFA}$$

where:

AC=Airborne fiber concentration
FB=Total number of fibers greater than 5 μm counted
FL=Total number of fields counted on the filter
BFB=Total number of fibers greater than 5 μm counted in the blank
BFL=Total number of fields counted on the blank
ECA=Effective collecting area of filter (385 mm^2 nominal for a 25-mm filter.)
FR=Pump flow rate (L/min)
MFA=Microscope count field area (mm^2). This is 0.00785 mm^2 for a Walton-Beckett Graticule.
T=Sample collection time (min)
1,000=Conversion of L to cc

NOTE: The collection area of a filter is seldom equal to 385 mm^2. It is appropriate for laboratories to routinely monitor the exact diameter using an inside micrometer. The collection area is calculated according to the formula:

Area = †$(d/2)^2$

7.2. Short-Cut Calculation

Since a given analyst always has the same interpupillary distance, the number of fields per filter for a particular analyst will remain constant for a given size filter. The field size for that analyst is constant (i.e. the analyst is using an assigned microscope and is not changing the reticle).

For example, if the exposed area of the filter is always 385 mm^2 and the size of the field is always 0.00785 mm^2 the number of fields per filter will always be 49,000. In addition it is necessary to convert liters of air to cc. These three constants can then be combined such that ECA/(1,000×MFA)=49. The previous equation simplifies to:

$$AC = \frac{\left(\frac{FB}{FL}\right) - \left(\frac{BFB}{BFL}\right) \times 49}{FR \times T}$$

7.3. Recount Calculations

As mentioned in step 13 of Section 6.6.2., a ''blind recount'' of 10% of the slides is performed. In all cases, differences will be observed between the first and second counts of the same filter wedge. Most of these differences will be due to chance alone, that is, due to the random variability (precision) of the count method. Statistical recount criteria enables one to decide whether observed differences can be explained due to chance alone or are probably due to systematic differences between analysts, microscopes, or other biasing factors.

The following recount criterion is for a pair of counts that estimate AC in fibers/cc. The criterion is given at the type-I error level. That is, there is 5% maximum risk that we will reject a pair of counts for the reason that one might be biased, when the large observed difference is really due to chance.

Reject a pair of counts if:

$$\left|\sqrt{AC_2} - \sqrt{AC_1}\right| > 2.78 \times \left(\sqrt{AC_{AVG}}\right) \times CV_{FB}$$

Where:

AC_1=lower estimated airborne fiber concentration
AC_2=higher estimated airborne fiber concentration
AC_{avg}=average of the two concentration estimates

CV_{FB}=CV for the average of the two concentration estimates

If a pair of counts are rejected by this criterion then, recount the rest of the filters in the submitted set. Apply the test and reject any other pairs failing the test. Rejection shall include a memo to the industrial hygienist stating that the sample failed a statistical test for homogeneity and the true air concentration may be significantly different than the reported value.

7.4. Reporting Results

Report results to the industrial hygienist as fibers/cc. Use two significant figures. If multiple analyses are performed on a sample, an average of the results is to be reported unless any of the results can be rejected for cause.

8. References

8.1. Dreesen, W.C., et al., *U.S. Public Health Service: A Study of Asbestosis in the Asbestos Textile Industry* (Public Health Bulletin No. 241), U.S. Treasury Dept., Washington, DC, 1938.

8.2. *Asbestos Research Council: The Measurement of Airborne Asbestos Dust by the Membrane Filter Method* (Technical Note), Asbestos Research Council, Rockdale, Lancashire, Great Britain, 1969.

8.3. Bayer, S.G., Zumwalde, R.D., Brown, T.A., *Equipment and Procedure for Mounting Millipore Filters and Counting Asbestos Fibers by Phase Contrast Microscopy,* Bureau of Occupational Health, U.S. Dept. of Health, Education and Welfare, Cincinnati, OH, 1969.

8.4. *NIOSH Manual of Analytical Methods,* 2nd ed., Vol. 1 (DHEW/NIOSH Pub. No. 77–157–A). National Institute for Occupational Safety and Health, Cincinnati, OH, 1977. pp. 239–1—239–21.

8.5. *Asbestos,* Code of Federal Regulations 29 CFR 1910.1001. 1971.

8.6. *Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite. Final Rule,* FEDERAL REGISTER 51:119 (20 June 1986). pp. 22612–22790.

8.7. *Asbestos, Tremolite, Anthophyllite, and Actinolite,* Code of Federal Regulations 1910.1001. 1988. pp. 711–752.

8.8. *Criteria for a Recommended Standard—Occupational Exposure to Asbestos* (DHEW/NIOSH Pub. No. HSM 72–10267), National Institute for Occupational Safety and Health, NIOSH, Cincinnati, OH, 1972. pp. III–1—III–24.

8.9. Leidel, N.A., Bayer, S.G., Zumwalde, R.D., Busch, K.A., *USPHS/NIOSH Membrane Filter Method for Evaluating Airborne Asbestos Fibers* (DHEW/NIOSH Pub. No. 79–127). National Institute for Occupational Safety and Health, Cincinnati, OH, 1979.

8.10. Dixon, W.C., *Applications of Optical Microscopy in Analysis of Asbestos and Quartz,* Analytical Techniques in Occupational Health Chemistry, edited by D.D. Dollberg and A.W. Verstuyft. Wash. DC: American Chemical Society, (ACS Symposium Series 120) 1980. pp. 13–41.

Quality Control

The OSHA asbestos regulations require each laboratory to establish a quality control program. The following is presented as an example of how the OSHA-SLTC constructed its internal CV curve as part of meeting this requirement. Data is from 395 samples collected during OSHA compliance inspections and analyzed from October 1980 through April 1986.

Each sample was counted by 2 to 5 different counters independently of one another. The standard deviation and the CV statistic was calculated for each sample. This data was then plotted on a graph of CV vs. fibers/mm^2. A least squares regression was performed using the following equation:

$CV = \text{antilog}_{10}[A(\log_{10}(x))^2+B(\log_{10}(x))+C]$

where:

x = the number of fibers/mm^2

Application of least squares gave:

A = 0.182205

B = 0.973343

C = 0.327499

Using these values, the equation becomes:

$CV = \text{antilog}_{10}[0.182205(\log_{10}(x))^2 - 0.973343(\log_{10}(x))+0.327499]$

Sampling Pump Flow Rate Corrections

This correction is used if a difference greater than 5% in ambient temperature and/or pressure is noted between calibration and sampling sites and the pump does not compensate for the differences.

$$Q_{act} = Q_{cal} \times \sqrt{\left(\frac{P_{cal}}{P_{act}}\right) \times \left(\frac{T_{act}}{T_{cal}}\right)}$$

Where:

Q_{act} = actual flow rate

Q_{cal} = calibrated flow rate (if a rotameter was used, the rotameter value)

P_{cal} = uncorrected air pressure at calibration

P_{act} = uncorrected air pressure at sampling site

T_{act} = temperature at sampling site (K)

T_{cal} = temperature at calibration (K)

Walton-Beckett Graticule

When ordering the Graticule for asbestos counting, specify the exact disc diameter needed to fit the ocular of the microscope and the diameter (mm) of the circular counting area. Instructions for measuring the dimensions necessary are listed:

(1) Insert any available graticule into the focusing eyepiece and focus so that the graticule lines are sharp and clear.

(2) Align the microscope.

(3) Place a stage micrometer on the microscope object stage and focus the microscope on the graduated lines.

(4) Measure the magnified grid length, PL (μm), using the stage micrometer.

(5) Remove the graticule from the microscope and measure its actual grid length, AL (mm). This can be accomplished by using a mechanical stage fitted with verniers, or a jeweler's loupe with a direct reading scale.

(6) Let D=100 μm. Calculate the circle diameter, d_c (mm), for the Walton-Beckett graticule and specify the diameter when making a purchase:

$$d_c = \frac{AL \times D}{PL}$$

Example: If PL=108 μm, AL=2.93 mm and D=100 μm, then,

$$d_c = \frac{2.93 \times 100}{108} = 2.71\text{mm}$$

(7) Each eyepiece-objective-reticle combination on the microscope must be calibrated. Should any of the three be changed (by zoom adjustment, disassembly, replacement, etc.), the combination must be recalibrated. Calibration may change if interpupillary distance is changed.

Measure the field diameter, D (acceptable range: 100 ±2 μm) with a stage micrometer upon receipt of the graticule from the manufacturer. Determine the field area (mm^2).

Field Area = $\pi(D/2)^2$

If D = 100 μm=0.1 mm, then

Field Area = $\pi(0.1\text{ mm}/2)^2 = 0.00785\text{ mm}^2$

The Graticule is available from: Graticules Ltd., Morley Road, Tonbridge TN9 IRN, Kent, England (Telephone 011–44–732–359061). Also available from PTR Optics Ltd., 145 Newton Street, Waltham, MA 02154 [telephone (617) 891–6000] or McCrone Accessories and Components, 2506 S. Michigan Ave., Chicago, IL 60616 [phone (312)-842–7100]. The graticule is custom made for each microscope.

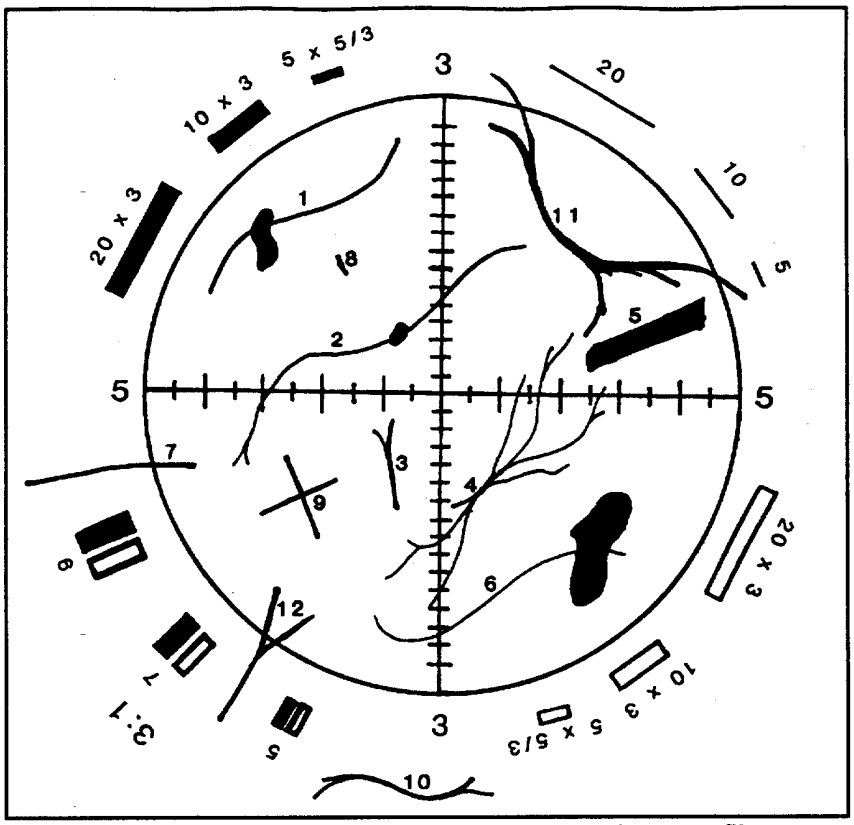


Figure 1: Walton-Beckett Graticule with some explanatory fibers.

COUNTS FOR THE FIBERS IN THE FIGURE

Structure No.	Count	Explanation
1 to 6	1	Single fibers all contained within the Circle.
7	½	Fiber crosses circle once.
8	0	Fiber too short.
9	2	Two crossing fibers.
10	0	Fiber outside graticule.
11	0	Fiber crosses graticule twice.
12	½	Although split, fiber only crosses once.

APPENDIX C TO § 1926.1101 [RESERVED]

APPENDIX D TO § 1926.1101—MEDICAL QUESTIONNAIRES; MANDATORY

This mandatory appendix contains the medical questionnaires that must be administered to all employees who are exposed to asbestos above the permissible exposure limit, and who will therefore be included in their employer's medical surveillance program. Part 1 of the appendix contains the Initial Medical Questionnaire, which must be obained for all new hires who will be covered by the medical surveillance requirements. Part 2 includes the abbreviated Periodical Medical Questionnaire, which must be administered to all employees who are provided periodic medical examinations under the medical surveillance provisions of the standard.

Part 1
INITIAL MEDICAL QUESTIONNAIRE

1. NAME _____

2. SOCIAL SECURITY # ___ ___ ___ ___ ___ ___ ___ ___ ___
(1 2 3 4 5 6 7 8 9)

3. CLOCK NUMBER ___ ___ ___ ___ ___ ___
(10 11 12 13 14 15)

4. PRESENT OCCUPATION _____

5. PLANT _____

6. ADDRESS _____

7. _____
(Zip Code)

8. TELEPHONE NUMBER _____

9. INTERVIEWER _____

10. DATE _____ ___ ___ ___ ___ ___ ___
(16 17 18 19 20 21)

11. Date of Birth _____ ___ ___ ___ ___ ___ ___
Month Day Year (22 23 24 25 26 27)

12. Place of Birth _____

13. Sex
1. Male ___
2. Female ___

14. What is your marital status?
1. Single ___
2. Married ___
3. Widowed ___
4. Separated/ Divorced ___

15. Race
1. White ___
2. Black ___
3. Asian ___
4. Hispanic ___
5. Indian ___
6. Other ___

16. What is the highest grade completed in school? _____
(For example 12 years is completion of high school)

OCCUPATIONAL HISTORY

17A. Have you ever worked full time (30 hours per week or more) for 6 months or more? 1. Yes __ 2. No __

IF YES TO 17A:

B. Have you ever worked for a year or more in any dusty job? 1. Yes __ 2. No __ 3. Does Not Apply __

Specify job/industry _____ Total Years Worked ___

Was dust exposure: 1. Mild ___ 2. Moderate ___ 3. Severe ___

C. Have you even been exposed to gas or chemical fumes in your work? 1. Yes ___ 2. No ___
Specify job/industry _____ Total Years Worked ___

Was exposure: 1. Mild ___ 2. Moderate ___ 3. Severe ___

D. What has been your usual occupation or job--the one you have worked at the longest?

1. Job occupation _____

2. Number of years employed in this occupation _____

3. Position/job title _____

4. Business, field or industry _____

(Record on lines the years in which you have worked in any of these industries, e.g. 1960-1969)

Have you ever worked:

	YES	NO
E. In a mine?.....	[__]	[__]
F. In a quarry?.....	[__]	[__]
G. In a foundry?.....	[__]	[__]
H. In a pottery?.....	[__]	[__]
I. In a cotton, flax or hemp mill?.....	[__]	[__]
J. With asbestos?.....	[__]	[__]

18. PAST MEDICAL HISTORY

	YES	NO
A. Do you consider yourself to be in good health?	[__]	[__]
If "NO" state reason _____		
B. Have you any defect of vision?.....	[__]	[__]
If "YES" state nature of defect _____		
C. Have you any hearing defect?.....	[__]	[__]
If "YES" state nature of defect _____		

D. Are you suffering from or have you ever suffered from:

a. Epilepsy (or fits, seizures, convulsions)?	[__]	[__]
b. Rheumatic fever?	[__]	[__]
c. Kidney disease?	[__]	[__]
d. Bladder disease?	[__]	[__]
e. Diabetes?	[__]	[__]
f. Jaundice?	[__]	[__]

19. CHEST COLDS AND CHEST ILLNESSES

19A. If you get a cold, does it usually go to your chest? (Usually means more than 1/2 the time) — 1. Yes __ 2. No __ 3. Don't get colds __

20A. During the past 3 years, have you had any chest illnesses that have kept you off work, indoors at home, or in bed? — 1. Yes __ 2. No __

IF YES TO 20A:

B. Did you produce phlegm with any of these chest illnesses? — 1. Yes __ 2. No __ 3. Does Not Apply __

C. In the last 3 years, how many such illnesses with (increased) phlegm did you have which lasted a week or more? — Number of illnesses __ No such illnesses __

21. Did you have any lung trouble before the age of 16? — 1. Yes __ 2. No __

22. Have you ever had any of the following?

1A. Attacks of bronchitis? — 1. Yes __ 2. No __

IF YES TO 1A:

B. Was it confirmed by a doctor? — 1. Yes __ 2. No __ 3. Does Not Apply __

C. At what age was your first attack? — Age in Years __ Does Not Apply __

2A. Pneumonia (include bronchopneumonia)? — 1. Yes __ 2. No __

IF YES TO 2A:

B. Was it confirmed by a doctor? — 1. Yes __ 2. No __ 3. Does Not Apply __

C. At what age did you first have it? — Age in Years __ Does Not Apply __

3A. Hay Fever? 1. Yes __ 2. No __

IF YES TO 3A:
B. Was it confirmed by a doctor? 1. Yes __ 2. No __ 3. Does Not Apply __

C. At what age did it start? Age in Years __ Does Not Apply __

23A. Have you ever had chronic bronchitis? 1. Yes __ 2. No __

IF YES TO 23A:
B. Do you still have it? 1. Yes __ 2. No __ 3. Does Not Apply __

C. Was it confirmed by a doctor? 1. Yes __ 2. No __ 3. Does Not Apply __

D. At what age did it start? Age in Years __ Does Not Apply __

24A. Have you ever had emphysema? 1. Yes __ 2. No __

IF YES TO 24A:
B. Do you still have it? 1. Yes __ 2. No __ 3. Does Not Apply __

C. Was it confirmed by a doctor? 1. Yes __ 2. No __ 3. Does Not Apply __

D. At what age did it start? Age in Years __ Does Not Apply __

25A. Have you ever had asthma? 1. Yes __ 2. No __

IF YES TO 25A:
B. Do you still have it? 1. Yes __ 2. No __ 3. Does Not Apply __

C. Was it confirmed by a doctor? 1. Yes __ 2. No __ 3. Does Not Apply __

D. At what age did it start? Age in Years __ Does Not Apply __

E. If you no longer have it, at what age did it stop? Age stopped __ Does Not Apply __

26. Have you ever had:

A. Any other chest illness? 1. Yes __ 2. No __

If yes, please specify _____

B. Any chest operations? 1. Yes __ 2. No __

If yes, please specify _____

C. Any chest injuries? 1. Yes __ 2. No __

If yes, please specify _____

27A. Has a doctor ever told you that you had heart trouble? 1. Yes __ 2. No __

IF YES TO 27A:

B. Have you ever had treatment for heart trouble in the past 10 years? 1. Yes __ 2. No __ 3. Does Not Apply __

28A. Has a doctor ever told you that you had high blood pressure? 1. Yes __ 2. No __

IF YES TO 28A:

B. Have you had any treatment for high blood pressure (hypertension) in the past 10 years? 1. Yes __ 2. No __ 3. Does Not Apply __

29. When did you last have your chest X-rayed? (Year) __ __ __ __ (25 26 27 28)

30. Where did you last have your chest X-rayed (if known)? _____

What was the outcome? _____

FAMILY HISTORY

31. Were either of your natural parents ever told by a doctor that they had a chronic lung condition such as:

	FATHER			MOTHER		
	1. Yes	2. No	3. Don't Know	1. Yes	2. No	3. Don't Know
A. Chronic Bronchitis?	___	___	___	___	___	___
B. Emphysema?	___	___	___	___	___	___
C. Asthma?	___	___	___	___	___	___
D. Lung cancer?	___	___	___	___	___	___
E. Other chest conditions	___	___	___	___	___	___
F. Is parent currently alive?	___	___	___	___	___	___
G. Please Specify	___ Age if Living ___ Age at Death ___ Don't Know			___ Age if Living ___ Age at Death ___ Don't Know		

H. Please specify cause of death _____ _____

COUGH

32A. Do you usually have a cough? (Count a cough with first smoke or on first going out of doors. Exclude clearing of throat.) [If no, skip to question 32C.] 1. Yes __ 2. No __

B. Do you usually cough as much as 4 to 6 times a day 4 or more days out of the week? 1. Yes __ 2. No __

C. Do you usually cough at all on getting up or first thing in the morning? 1. Yes __ 2. No __

D. Do you usually cough at all during the rest of the day or at night? 1. Yes __ 2. No __

IF YES TO ANY OF ABOVE (32A, B, C, or D), ANSWER THE FOLLOWING. IF NO TO ALL, CHECK DOES NOT APPLY AND SKIP TO NEXT PAGE

E. Do you usually cough like this on most days for 3 consecutive months or more during the year? 1. Yes __ 2. No __ 3. Does not apply __

F. For how many years have you had the cough? Number of years __ Does not apply __

33A. Do you usually bring up phlegm from your chest? (Count phlegm with the first smoke or on first going out of doors. Exclude phlegm from the nose. Count swallowed phlegm.) (If no, skip to 33C) 1. Yes __ 2. No __

B. Do you usually bring up phlegm like this as much as twice a day 4 or more days out of the week? 1. Yes __ 2. No __

C. Do you usually bring up phlegm at all on getting up or first thing in the morning? 1. Yes __ 2. No __

D. Do you usually bring up phlegm at all during the rest of the day or at night? 1. Yes __ 2. No __

IF YES TO ANY OF THE ABOVE (33A, B, C, or D), ANSWER THE FOLLOWING: IF NO TO ALL, CHECK DOES NOT APPLY AND SKIP TO 34A.

E. Do you bring up phlegm like this on most days for 3 consecutive months or more during the year? 1. Yes __ 2. No __ 3. Does not apply __

F. For how many years have you had trouble with phlegm? — Number of years __ / Does not apply __

EPISODES OF COUGH AND PHLEGM

34A. Have you had periods or episodes of (increased*) cough and phlegm lasting for 3 weeks or more each year?
*(For persons who usually have cough and/or phlegm) — 1. Yes __ 2. No __

If YES TO 34A
B. For how long have you had at least 1 such episode per year? — Number of years __ / Does not apply __

WHEEZING

35A. Does your chest ever sound wheezy or whistling
1. When you have a cold? — 1. Yes __ 2. No __
2. Occasionally apart from colds? — 1. Yes __ 2. No __
3. Most days or nights? — 1. Yes __ 2. No __

IF YES TO 1, 2, or 3 in 35A
B. For how many years has this been present? — Number of years __ / Does not apply __

36A. Have you ever had an attack of wheezing that has made you feel short of breath? — 1. Yes __ 2. No __

IF YES TO 36A
B. How old were you when you had your first such attack? — Age in years __ / Does not apply __

C. Have you had 2 or more such episodes? — 1. Yes __ 2. No __ / 3. Does not apply __

D. Have you ever required medicine or treatment for the(se) attack(s)? — 1. Yes __ 2. No __ / 3. Does not apply __

BREATHLESSNESS

37. If disabled from walking by any condition other than heart or lung disease, please describe and proceed to question 39A.
Nature of condition(s)_____

38A. Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill? — 1. Yes __ 2. No __

IF YES TO 38A

B. Do you have to walk slower than people of your age on the level because of breathlessness? — 1. Yes __ 2. No __ 3. Does not apply __

C. Do you ever have to stop for breath when walking at your own pace on the level? — 1. Yes __ 2. No __ 3. Does not apply __

D. Do you ever have to stop for breath after walking about 100 yards (or after a few minutes) on the level? — 1. Yes __ 2. No __ 3. Does not apply __

E. Are you too breathless to leave the house or breathless on dressing or climbing one flight of stairs? — 1. Yes __ 2. No __ 3. Does not apply __

TOBACCO SMOKING

39A. Have you ever smoked cigarettes? (No means less than 20 packs of cigarettes or 12 oz. of tobacco in a lifetime or less than 1 cigarette a day for 1 year.) — 1. Yes __ 2. No __

IF YES TO 39A

B. Do you now smoke cigarettes (as of one month ago) — 1. Yes __ 2. No __ 3. Does not apply __

C. How old were you when you first started regular cigarette smoking? — Age in years __ Does not apply __

D. If you have stopped smoking cigarettes completely, how old were you when you stopped? — Age stopped __ Check if still smoking __ Does not apply __

E. How many cigarettes do you smoke per day now? — Cigarettes per day __ Does not apply __

F. On the average of the entire time you smoked, how many cigarettes did you smoke per day? — Cigarettes per day __ Does not apply __

G. Do or did you inhale the cigarette smoke? — 1. Does not apply __ 2. Not at all __ 3. Slightly __ 4. Moderately __ 5. Deeply __

40A. Have you ever smoked a pipe regularly? (Yes means more than 12 oz. of tobacco in a lifetime.) — 1. Yes __ 2. No __

IF YES TO 40A:
FOR PERSONS WHO HAVE EVER SMOKED A PIPE

B. 1. How old were you when you started to smoke a pipe regularly?	Age __	
2. If you have stopped smoking a pipe completely, how old were you when you stopped?	Age stopped Check if still smoking pipe Does not apply	__ __ __
C. On the average over the entire time you smoked a pipe, how much pipe tobacco did you smoke per week?	__ oz. per week (a standard pouch of tobacco contains 1 1/2 oz.) __ Does not apply	
D. How much pipe tobacco are you smoking now?	oz. per week Not currently smoking a pipe	__ __
E. Do you or did you inhale the pipe smoke?	1. Never smoked 2. Not at all 3. Slightly 4. Moderately 5. Deeply	__ __ __ __ __
41A. Have you ever smoked cigars regularly? (Yes means more than 1 cigar a week for a year)	1. Yes __ 2. No	

IF YES TO 41A
FOR PERSONS WHO HAVE EVER SMOKED CIGARS

B. 1. How old were you when you started smoking cigars regularly?	Age __	
2. If you have stopped smoking cigars completely, how old were you when you stopped.	Age stopped Check if still smoking cigars Does not apply	__ __ __
C. On the average over the entire time you smoked cigars, how many cigars did you smoke per week?	Cigars per week Does not apply	__ __
D. How many cigars are you smoking per week now?	Cigars per week Check if not smoking cigars currently	__ __
E. Do you or did you inhale the cigar smoke?	1. Never smoked 2. Not at all 3. Slightly 4. Moderately 5. Deeply	__ __ __ __ __

Signature _____ Date _____

Part 2
PERIODIC MEDICAL QUESTIONNAIRE

1. NAME _____

2. SOCIAL SECURITY # ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
(1 2 3 4 5 6 7 8 9)

3. CLOCK NUMBER ___ ___ ___ ___ ___ ___
(10 11 12 13 14 15)

4. PRESENT OCCUPATION _____

5. PLANT _____

6. ADDRESS _____

7. _____
(Zip Code)

8. TELEPHONE NUMBER _____

9. INTERVIEWER _____

10. DATE _____ ___ ___ ___ ___ ___ ___
(16 17 18 19 20 21)

11. What is your marital status?
1. Single ___
2. Married ___
3. Widowed ___
4. Separated/ Divorced ___

12. OCCUPATIONAL HISTORY

12A. In the past year, did you work full time (30 hours per week or more) for 6 months or more?
1. Yes ___ 2. No ___

IF YES TO 12A:

12B. In the past year, did you work in a dusty job?
1. Yes ___ 2. No ___
3. Does Not Apply ___

12C. Was dust exposure: 1. Mild ___ 2. Moderate ___ 3. Severe ___

12D. In the past year, were you exposed to gas or chemical fumes in your work?
1. Yes ___ 2. No ___

12E. Was exposure: 1. Mild ___ 2. Moderate ___ 3. Severe ___

12F. In the past year, what was your:
1. Job/occupation? _____
2. Position/job title? _____

13. RECENT MEDICAL HISTORY

13A. Do you consider yourself to be in good health? Yes ___ No ___

If NO, state reason _____

13B. In the past year, have you developed:

	Yes	No
Epilepsy?	___	___
Rheumatic fever?	___	___
Kidney disease?	___	___
Bladder disease?	___	___
Diabetes?	___	___
Jaundice?	___	___
Cancer?	___	___

14. CHEST COLDS AND CHEST ILLNESSES

14A. If you get a cold, does it usually go to your chest? (Usually means more than 1/2 the time)
1. Yes ___ 2. No ___
3. Don't get colds ___

15A. During the past year, have you had any chest illnesses that have kept you off work, indoors at home, or in bed?
1. Yes ___ 2. No ___
3. Does Not Apply ___

IF YES TO 15A:

15B. Did you produce phlegm with any of these chest illnesses?
1. Yes ___ 2. No ___
3. Does Not Apply ___

15C. In the past year, how many such illnesses with (increased) phlegm did you have which lasted a week or more?
Number of illnesses ___
No such illnesses ___

16. RESPIRATORY SYSTEM

In the past year have you had:

	Yes or No	Further Comment on Positive Answers
Asthma	_____	
Bronchitis	_____	
Hay Fever	_____	
Other Allergies	_____	

	Yes or No	Further Comment on Positive Answers
Pneumonia	_____	
Tuberculosis	_____	
Chest Surgery	_____	
Other Lung Problems	_____	
Heart Disease	_____	

Do you have:

	Yes or No	Further Comment on Positive Answers
Frequent colds	_____	
Chronic cough	_____	
Shortness of breath when walking or climbing one flight or stairs	_____	

Do you:

Wheeze	_____	
Cough up phlegm	_____	
Smoke cigarettes	_____	Packs per day ___ How many years ___

Date _____ Signature _____

APPENDIX E TO §1926.1101—INTERPRETATION AND CLASSIFICATION OF CHEST ROENTGENOGRAMS—MANDATORY

(a) Chest roentgenograms shall be interpreted and classified in accordance with a professionally accepted classification system and recorded on an interpretation form following the format of the CDC/NIOSH (M) 2.8 form. As a minimum, the content within the bold lines of this form (items 1 through 4) shall be included. This form is not to be submitted to NIOSH.

(b) Roentgenograms shall be interpreted and classified only by a B-reader, a board eligible/certified radiologist, or an experienced physician with known s.

(c) All interpreters, whenever interpreting chest roentgenograms made under this section, shall have immediately available for reference a complete set of the ILO-U/C International Classification of Radiographs for Pneumoconioses, 1980.

APPENDIX F TO §1926.1101—WORK PRACTICES AND ENGINEERING CONTROLS FOR CLASS I ASBESTOS OPERATIONS (NON-MANDATORY)

This is a non-mandatory appendix to the asbestos standards for construction and for shipyards. It describes criteria and procedures for erecting and using negative pressure enclosures for Class I Asbestos Work, when NPEs are used as an allowable control method to comply with paragraph (g)(5)(i) of this section. Many small and variable details are involved in the erection of a negative pressure enclosure. OSHA and most participants in the rulemaking agreed that only the major, more performance oriented criteria should be made mandatory. These criteria are set out in paragraph (g) of this section. In addition, this appendix includes these mandatory specifications and procedures in its guidelines in order to make this appendix coherent and helpful. The mandatory nature of the criteria which appear in the regulatory text is not changed because they are included in this ''non-mandatory'' appendix.

Similarly, the additional criteria and procedures included as guidelines in the appendix, do not become mandatory because mandatory criteria are also included in these comprehensive guidelines.

In addition, none of the criteria, both mandatory and recommended, are meant to specify or imply the need for use of patented or licensed methods or equipment. Recommended specifications included in this attachment should not discourage the use of creative alternatives which can be shown to reliably achieve the objectives of negative-pressure enclosures.

Requirements included in this appendix, cover general provisions to be followed in all asbestos jobs, provisions which must be followed for all Class I asbestos jobs, and provisions governing the construction and testing of negative pressure enclosures. The first category includes the requirement for use of wet methods, HEPA vacuums, and immediate bagging of waste; Class I work must conform to the following provisions:

- oversight by competent person
- use of critical barriers over all openings to work area
- isolation of HVAC systems
- use of impermeable dropcloths and coverage of all objects within regulated areas

In addition, more specific requirements for NPEs include:

- maintenance of −0.02 inches water gauge within enclosure
- manometric measurements
- air movement away from employees performing removal work
- smoke testing or equivalent for detection of leaks and air direction
- deactivation of electrical circuits, if not provided with ground-fault circuit interrupters.

Planning the Project

The standard requires that an exposure assessment be conducted before the asbestos job is begun [§1926.1101 (f)(1)]. Information needed for that assessment, includes data relating to prior similar jobs, as applied to the specific variables of the current job. The information needed to conduct the assessment will be useful in planning the project, and in complying with any reporting requirements under this standard, when significant changes are being made to a control system listed in the standard, [see also those of USEPA (40 CFR 61, subpart M). Thus, although the standard does not explicitly require the preparation of a written asbestos removal plan, the usual constituents of such a plan, i.e., a description of the enclosure, the equipment, and the procedures to be used throughout the project, must be determined before the enclosure can be erected. The following information should be included in the planning of the system:

A physical description of the work area;
A description of the approximate amount of material to be removed;
A schedule for turning off and sealing existing ventilation systems;
Personnel hygiene procedures;
A description of personal protective equipment and clothing to be worn by employees;
A description of the local exhaust ventilation systems to be used and how they are to be tested;
A description of work practices to be observed by employees;
An air monitoring plan;
A description of the method to be used to transport waste material; and
The location of the dump site.

Materials and Equipment Necessary for Asbestos Removal

Although individual asbestos removal projects vary in terms of the equipment required to accomplish the removal of the materials, some equipment and materials are common to most asbestos removal operations.

Plastic sheeting used to protect horizontal surfaces, seal HVAC openings or to seal vertical openings and ceilings should have a minimum thickness of 6 mils. Tape or other adhesive used to attach plastic sheeting should be of sufficient adhesive strength to support the weight of the material plus all stresses encountered during the entire duration of the project without becoming detached from the surface.

Other equipment and materials which should be available at the beginning of each project are:

—HEPA Filtered Vacuum is essential for cleaning the work area after the asbestos has been removed. It should have a long hose capable of reaching out-of-the-way places, such as areas above ceiling tiles, behind pipes, etc.

—Portable air ventilation systems installed to provide the negative air pressure and air removal from the enclosure must be equipped with a HEPA filter. The number and capacity of units required to ventilate an enclosure depend on the size of the area to be ventilated. The filters for these systems should be designed in such a manner that they can be replaced when the air flow volume is reduced by the build-up of dust in the filtration material. Pressure monitoring devices with alarms and strip chart recorders attached to each system to indicate the pressure differential and the loss due to dust buildup on the filter are recommended.

—Water sprayers should be used to keep the asbestos material as saturated as possible during removal; the sprayers will provide a

fine mist that minimizes the impact of the spray on the material.

—Water used to saturate the asbestos containing material can be amended by adding at least 15 milliliters (¼ ounce) of wetting agent in 1 liter (1 pint) of water. An example of a wetting agent is a 50/50 mixture of polyoxyethylene ether and polyoxyethylene polyglycol ester.

—Backup power supplies are recommended, especially for ventilation systems.

—Shower and bath water should be with mixed hot and cold water faucets. Water that has been used to clean personnel or equipment should either be filtered or be collected and discarded as asbestos waste. Soap and shampoo should be provided to aid in removing dust from the workers' skin and hair.

—See paragraphs (h) and (i) of this section for appropriate respiratory protection and protective clothing.

—See paragraph (k) of this section for required signs and labels.

Preparing the Work Area

Disabling HVAC Systems: The power to the heating, ventilation, and air conditioning systems that service the restricted area must be deactivated and locked off. All ducts, grills, access ports, windows and vents must be sealed off with two layers of plastic to prevent entrainment of contaminated air.

Operating HVAC Systems in the Restricted Area: If components of a HVAC system located in the restricted area are connected to a system that will service another zone during the project, the portion of the duct in the restricted area must be sealed and pressurized. Necessary precautions include caulking the duct joints, covering all cracks and openings with two layers of sheeting, and pressurizing the duct throughout the duration of the project by restricting the return air flow. The power to the fan supplying the positive pressure should be locked ''on'' to prevent pressure loss.

Sealing Elevators: If an elevator shaft is located in the restricted area, it should be either shut down or isolated by sealing with two layers of plastic sheeting. The sheeting should provide enough slack to accommodate the pressure changes in the shaft without breaking the air-tight seal.

Removing Mobile Objects: All movable objects should be cleaned and removed from the work area before an enclosure is constructed unless moving the objects creates a hazard. Mobile objects will be assumed to be contaminated and should be either cleaned with amended water and a HEPA vacuum and then removed from the area or wrapped and then disposed of as hazardous waste.

Cleaning and Sealing Surfaces: After cleaning with water and a HEPA vacuum, surfaces of stationary objects should be covered with two layers of plastic sheeting. The sheeting should be secured with duct tape or an equivalent method to provide a tight seal around the object.

Bagging Waste: In addition to the requirement for immediate bagging of waste for disposal, it is further recommended that the waste material be double-bagged and sealed in plastic bags designed for asbestos disposal. The bags should be stored in a waste storage area that can be controlled by the workers conducting the removal. Filters removed from air handling units and rubbish removed from the area are to be bagged and handled as hazardous waste.

Constructing the Enclosure

The enclosure should be constructed to provide an air-tight seal around ducts and openings into existing ventilation systems and around penetrations for electrical conduits, telephone wires, water lines, drain pipes, etc. Enclosures should be both airtight and watertight except for those openings designed to provide entry and/or air flow control.

Size: An enclosure should be the minimum volume to encompass all of the working surfaces yet allow unencumbered movement by the worker(s), provide unrestricted air flow past the worker(s), and ensure walking surfaces can be kept free of tripping hazards.

Shape: The enclosure may be any shape that optimizes the flow of ventilation air past the worker(s).

Structural Integrity: The walls, ceilings and floors must be supported in such a manner that portions of the enclosure will not fall down during normal use.

Openings: It is not necessary that the structure be airtight; openings may be designed to direct air flow. Such openings should be located at a distance from active removal operations. They should be designed to draw air into the enclosure under all anticipated circumstances. In the event that negative pressure is lost, they should be fitted with either HEPA filters to trap dust or automatic trap doors that prevent dust from escaping the enclosure. Openings for exits should be controlled by an airlock or a vestibule.

Barrier Supports: Frames should be constructed to support all unsupported spans of sheeting.

Sheeting: Walls, barriers, ceilings, and floors should be lined with two layers of plastic sheeting having a thickness of at least 6 mil.

Seams: Seams in the sheeting material should be minimized to reduce the possibilities of accidental rips and tears in the adhesive or connections. All seams in the sheeting should overlap, be staggered and not be located at corners or wall-to-floor joints. Areas Within an Enclosure: Each enclosure consists of a work area, a decontamination area, and waste storage area. The work area

where the asbestos removal operations occur should be separated from both the waste storage area and the contamination control area by physical curtains, doors, and/or airflow patterns that force any airborne contamination back into the work area.

See paragraph (j) of this section for requirements for hygiene facilities.

During egress from the work area, each worker should step into the equipment room, clean tools and equipment, and remove gross contamination from clothing by wet cleaning and HEPA vacuuming. Before entering the shower area, foot coverings, head coverings, hand coverings, and coveralls are removed and placed in impervious bags for disposal or cleaning. Airline connections from airline respirators with HEPA disconnects and power cables from powered air-purifying respirators (PAPRs) will be disconnected just prior to entering the shower room.

Establishing Negative Pressure Within the Enclosure

Negative Pressure: Air is to be drawn into the enclosure under all anticipated conditions and exhausted through a HEPA filter for 24 hours a day during the entire duration of the project.

Air Flow Tests: Air flow patterns will be checked before removal operations begin, at least once per operating shift and any time there is a question regarding the integrity of the enclosure. The primary test for air flow is to trace air currents with smoke tubes or other visual methods. Flow checks are made at each opening and at each doorway to demonstrate that air is being drawn into the enclosure and at each worker's position to show that air is being drawn away from the breathing zone.

Monitoring Pressure Within the Enclosure: After the initial air flow patterns have been checked, the static pressure must be monitored within the enclosure. Monitoring may be made using manometers, pressure gauges, or combinations of these devices. It is recommended that they be attached to alarms and strip chart recorders at points identified by the design engineer.

Corrective Actions: If the manometers or pressure gauges demonstrate a reduction in pressure differential below the required level, work should cease and the reason for the change investigated and appropriate changes made. The air flow patterns should be retested before work begins again.

Pressure Differential: The design parameters for static pressure differentials between the inside and outside of enclosures typically range from 0.02 to 0.10 inches of water gauge, depending on conditions. All zones inside the enclosure must have less pressure than the ambient pressure outside of the enclosure (−0.02 inches water gauge differential). Design specifications for the differential vary according to the size, configuration, and shape of the enclosure as well as ambient and mechanical air pressure conditions around the enclosure.

Air Flow Patterns: The flow of air past each worker shall be enhanced by positioning the intakes and exhaust ports to remove contaminated air from the worker's breathing zone, by positioning HEPA vacuum cleaners to draw air from the worker's breathing zone, by forcing relatively uncontaminated air past the worker toward an exhaust port, or by using a combination of methods to reduce the worker's exposure.

Air Handling Unit Exhaust: The exhaust plume from air handling units should be located away from adjacent personnel and intakes for HVAC systems.

Air Flow Volume: The air flow volume (cubic meters per minute) exhausted (removed) from the workplace must exceed the amount of makeup air supplied to the enclosure. The rate of air exhausted from the enclosure should be designed to maintain a negative pressure in the enclosure and air movement past each worker. The volume of air flow removed from the enclosure should replace the volume of the container at every 5 to 15 minutes. Air flow volume will need to be relatively high for large enclosures, enclosures with awkward shapes, enclosures with multiple openings, and operations employing several workers in the enclosure.

Air Flow Velocity: At each opening, the air flow velocity must visibly ''drag'' air into the enclosure. The velocity of air flow within the enclosure must be adequate to remove airborne contamination from each worker's breathing zone without disturbing the asbestos-containing material on surfaces.

Airlocks: Airlocks are mechanisms on doors and curtains that control the air flow patterns in the doorways. If air flow occurs, the patterns through doorways must be such that the air flows toward the inside of the enclosure. Sometimes vestibules, double doors, or double curtains are used to prevent air movement through the doorways. To use a vestibule, a worker enters a chamber by opening the door or curtain and then closing the entry before opening the exit door or curtain.

Airlocks should be located between the equipment room and shower room, between the shower room and the clean room, and between the waste storage area and the outside of the enclosure. The air flow between adjacent rooms must be checked using smoke tubes or other visual tests to ensure the flow patterns draw air toward the work area without producing eddies.

Monitoring for Airborne Concentrations

In addition to the breathing zone samples taken as outlined in paragraph (f) of this section, samples of air should be taken to demonstrate the integrity of the enclosure, the cleanliness of the clean room and shower

area, and the effectiveness of the HEPA filter. If the clean room is shown to be contaminated, the room must be relocated to an uncontaminated area.

Samples taken near the exhaust of portable ventilation systems must be done with care.

General Work Practices

Preventing dust dispersion is the primary means of controlling the spread of asbestos within the enclosure. Whenever practical, the point of removal should be isolated, enclosed, covered, or shielded from the workers in the area. Waste asbestos containing materials must be bagged during or immediately after removal; the material must remain saturated until the waste container is sealed.

Waste material with sharp points or corners must be placed in hard air-tight containers rather than bags.

Whenever possible, large components should be sealed in plastic sheeting and removed intact.

Bags or containers of waste will be moved to the waste holding area, washed, and wrapped in a bag with the appropriate labels.

Cleaning the Work Area

Surfaces within the work area should be kept free of visible dust and debris to the extent feasible. Whenever visible dust appears on surfaces, the surfaces within the enclosure must be cleaned by wiping with a wet sponge, brush, or cloth and then vacuumed with a HEPA vacuum.

All surfaces within the enclosure should be cleaned before the exhaust ventilation system is deactivated and the enclosure is disassembled. An approved encapsulant may be sprayed onto areas after the visible dust has been removed.

APPENDIX G TO § 1926.1101 [RESERVED]

APPENDIX H TO § 1926.1101—SUBSTANCE TECHNICAL INFORMATION FOR ASBESTOS. NON-MANDATORY

I. Substance Identification

A. Substance: ''Asbestos'' is the name of a class of magnesium-silicate minerals that occur in fibrous form. Minerals that are included in this group are chrysotile, crocidolite, amosite, anthophyllite asbestos, tremolite asbestos, and actinolite asbestos.

B. Asbestos is and was used in the manufacture of heat-resistant clothing, automotive brake and clutch linings, and a variety of building materials including floor tiles, roofing felts, ceiling tiles, asbestos-cement pipe and sheet, and fire-resistant drywall. Asbestos is also present in pipe and boiler insulation materials and in sprayed-on materials located on beams, in crawlspaces, and between walls.

C. The potential for an asbestos-containing product to release breathable fibers depends largely on its degree of friability. Friable means that the material can be crumbled with hand pressure and is therefore likely to emit fibers. The fibrous fluffy sprayed-on materials used for fireproofing, insulation, or sound proofing are considered to be friable, and they readily release airborne fibers if disturbed. Materials such as vinyl-asbestos floor tile or roofing felt are considered nonfriable if intact and generally do not emit airborne fibers unless subjected to sanding, sawing and other aggressive operations. Asbestos-cement pipe or sheet can emit airborne fibers if the materials are cut or sawed, or if they are broken.

D. Permissible exposure: Exposure to airborne asbestos fibers may not exceed 0.1 fibers per cubic centimeter of air (0.1 f/cc) averaged over the 8-hour workday, and 1 fiber per cubic centimeter of air (1.0 f/cc) averaged over a 30 minute work period.

II. Health Hazard Data

A. Asbestos can cause disabling respiratory disease and various types of cancers if the fibers are inhaled. Inhaling or ingesting fibers from contaminated clothing or skin can also result in these diseases. The symptoms of these diseases generally do not appear for 20 or more years after initial exposure.

B. Exposure to asbestos has been shown to cause lung cancer, mesothelioma, and cancer of the stomach and colon. Mesothelioma is a rare cancer of the thin membrane lining of the chest and abdomen. Symptoms of mesothelioma include shortness of breath, pain in the walls of the chest, and/or abdominal pain.

III. Respirators and Protective Clothing

A. Respirators: You are required to wear a respirator when performing tasks that result in asbestos exposure that exceeds the permissible exposure limit (PEL) of 0.1 f/cc and when performing certain designated operations. Air-purifying respirators equipped with a high-efficiency particulate air (HEPA) filter can be used where airborne asbestos fiber concentrations do not exceed 1.0 f/cc; otherwise, more protective respirators such as air-supplied, positive-pressure, full facepiece respirators must be used. Disposable respirators or dust masks are not permitted to be used for asbestos work. For effective protection, respirators must fit your face and head snugly. Your employer is required to conduct a fit test when you are first assigned a respirator and every 6 months thereafter. Respirators should not be loosened or removed in work situations where their use is required.

B. Protective Clothing: You are required to wear protective clothing in work areas where

asbestos fiber concentrations exceed the permissible exposure limit (PEL) of 0.1 f/cc.

IV. Disposal Procedures and Clean-up

A. Wastes that are generated by processes where asbestos is present include:

1. Empty asbestos shipping containers.
2. Process wastes such as cuttings, trimmings, or reject materials.
3. Housekeeping waste from wet-sweeping or HEPA-vacuuming.
4. Asbestos fireproofing or insulating material that is removed from buildings.
5. Asbestos-containing building products removed during building renovation or demolition.
6. Contaminated disposable protective clothing.

B. Empty shipping bags can be flattened under exhaust hoods and packed into airtight containers for disposal. Empty shipping drums are difficult to clean and should be sealed.

C. Vacuum bags or disposable paper filters should not be cleaned, but should be sprayed with a fine water mist and placed into a labeled waste container.

D. Process waste and housekeeping waste should be wetted with water or a mixture of water and surfactant prior to packaging in disposable containers.

E. Asbestos-containing material that is removed from buildings must be disposed of in leak-tight 6-mil plastic bags, plastic-lined cardboard containers, or plastic-lined metal containers. These wastes, which are removed while wet, should be sealed in containers before they dry out to minimize the release of asbestos fibers during handling.

V. Access to Information

A. Each year, your employer is required to inform you of the information contained in this standard and appendices for asbestos. In addition, your employer must instruct you in the proper work practices for handling asbestos-containing materials, and the correct use of protective equipment.

B. Your employer is required to determine whether you are being exposed to asbestos. Your employer must treat exposure to thermal system insulation and sprayed-on and troweled-on surfacing material as asbestos exposure, unless results of laboratory analysis show that the material does not contain asbestos. You or your representative has the right to observe employee measurements and to record the results obtained. Your employer is required to inform you of your exposure, and, if you are exposed above the permissible exposure limit, he or she is required to inform you of the actions that are being taken to reduce your exposure to within the permissible limit.

C. Your employer is required to keep records of your exposures and medical examinations. These exposure records must be kept for at least thirty (30) years. Medical records must be kept for the period of your employment plus thirty (30) years.

D. Your employer is required to release your exposure and medical records to your physician or designated representative upon your written request.

APPENDIX I TO §1926.1101—MEDICAL SURVEILLANCE GUIDELINES FOR ASBESTOS, NON-MANDATORY

I. Route of Entry

Inhalation, ingestion.

II. Toxicology

Clinical evidence of the adverse effects associated with exposure to asbestos is present in the form of several well-conducted epidemiological studies of occupationally exposed workers, family contacts of workers, and persons living near asbestos mines. These studies have shown a definite association between exposure to asbestos and an increased incidence of lung cancer, pleural and peritoneal mesothelioma, gastrointestinal cancer, and asbestosis. The latter is a disabling fibrotic lung disease that is caused only by exposure to asbestos. Exposure to asbestos has also been associated with an increased incidence of esophageal, kidney, laryngeal, pharyngeal, and buccal cavity cancers. As with other known chronic occupational diseases, disease associated with asbestos generally appears about 20 years following the first occurrence of exposure: There are no known acute effects associated with exposure to asbestos.

Epidemiological studies indicate that the risk of lung cancer among exposed workers who smoke cigarettes is greatly increased over the risk of lung cancer among non-exposed smokers or exposed nonsmokers. These studies suggest that cessation of smoking will reduce the risk of lung cancer for a person exposed to asbestos but will not reduce it to the same level of risk as that existing for an exposed worker who has never smoked.

III. Signs and Symptoms of Exposure-Related Disease

The signs and symptoms of lung cancer or gastrointestinal cancer induced by exposure to asbestos are not unique, except that a chest X-ray of an exposed patient with lung cancer may show pleural plaques, pleural calcification, or pleural fibrosis. Symptoms characteristic of mesothelioma include shortness of breath, pain in the walls of the chest, or abdominal pain. Mesothelioma has a much longer latency period compared with lung cancer (40 years versus 15–20 years), and mesothelioma is therefore more likely to be found among workers who were first exposed

to asbestos at an early age. Mesothelioma is always fatal.

Asbestosis is pulmonary tibrosis caused by the accumulation of asbestos fibers in the lungs. Symptoms include shortness of breath, coughing, fatigue, and vague feelings of sickness. When the fibrosis worsens, shortness of breath occurs even at rest. The diagnosis of asbestosis is based on a history of exposure to asbestos, the presence of characteristics radiologic changes, end-inspiratory crackles (rales), and other clinical features of fibrosing lung disease. Pleural plaques and thickening are observed on X-rays taken during the early stages of the disease. Asbestosis is often a progressive disease even in the absence of continued exposure, although this appears to be a highly individualized characteristic. In severe cases, death may be caused by respiratory or cardiac failure.

IV. Surveillance and Preventive Considerations

As noted above, exposure to asbestos has been linked to an increased risk of lung cancer, mesothelioma, gastrointestinal cancer, and asbestosis among occupationally exposed workers. Adequate screening tests to determine an employee's potential for developing serious chronic diseases, such as a cancer, from exposure to asbestos do not presently exist. However, some tests, particularly chest X-rays and pulmonary function tests, may indicate that an employee has been overexposed to asbestos increasing his or her risk of developing exposure related chronic diseases. It is important for the physician to become familiar with the operating conditions in which occupational exposure to asbestos is likely to occur. This is particularly important in evaluating medical and work histories and in conducting physical examinations. When an active employee has been identified as having been overexposed to asbestos measures taken by the employer to eliminate or mitigate further exposure should also lower the risk of serious long-term consequences.

The employer is required to institute a medical surveillance program for all employees who are or will be exposed to asbestos at or above the permissible exposure limit (0.1 fiber per cubic centimeter of air). All examinations and procedures must be performed by or under the supervision of a licensed physician, at a reasonable time and place, and at no cost to the employee.

Although broad latitude is given to the physician in prescribing specific tests to be included in the medical surveillance program, OSHA requires inclusion of the following elements in the routine examination:

(i) Medical and work histories with special emphasis directed to symptoms of the respiratory system, cardiovascular system, and digestive tract.

(ii) Completion of the respiratory disease questionnaire contained in appendix D.

(iii) A physical examination including a chest roentgenogram and pulmonary function test that includes measurement of the employee's forced vital capacity (FVC) and forced expiratory volume at one second (FEV_1).

(iv) Any laboratory or other test that the examining physician deems by sound medical practice to be necessary.

The employer is required to make the prescribed tests available at least annually to those employees covered; more often than specified if recommended by the examining physician; and upon termination of employment.

The employer is required to provide the physician with the following information: A copy of this standard and appendices; a description of the employee's duties as they relate to asbestos exposure; the employee's representative level of exposure to asbestos; a description of any personal protective and respiratory equipment used; and information from previous medical examinations of the affected employee that is not otherwise available to the physician. Making this information available to the physician will aid in the evaluation of the employee's health in relation to assigned duties and fitness to wear personal protective equipment, if required.

The employer is required to obtain a written opinion from the examining physician containing the results of the medical examination; the physician's opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of exposure-related disease; any recommended limitations on the employee or on the use of personal protective equipment; and a statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions related to asbestos exposure that require further explanation or treatment. This written opinion must not reveal specific findings or diagnoses unrelated to exposure to asbestos, and a copy of the opinion must be provided to the affected employee.

APPENDIX J TO §1926.1101—SMOKING CESSATION PROGRAM INFORMATION FOR ASBESTOS—NON-MANDATORY

The following organizations provide smoking cessation information.

1. The National Cancer Institute operates a toll-free Cancer Information Service (CIS) with trained personnel to help you. Call 1–800–4–CANCER* to reach the CIS office serving your area, or write: Office of Cancer Communications, National Cancer Institute, National Institutes of Health, Building 31 Room 10A24, Bethesda, Maryland 20892.

2. American Cancer Society, 3340 Peachtree Road, N.E., Atlanta, Georgia 30026, (404) 320–3333

The American Cancer Society (ACS) is a voluntary organization composed of 58 divisions and 3,100 local units. Through ''The Great American Smokeout'' in November, the annual Cancer Crusade in April, and numerous educational materials, ACS helps people learn about the health hazards of smoking and become successful ex-smokers.

3. American Heart Association, 7320 Greenville Avenue, Dallas, Texas 75231, (214) 750–5300

The American Heart Association (AHA) is a voluntary organization with 130,000 members (physicians, scientists, and laypersons) in 55 state and regional groups. AHA produces a variety of publications and audiovisual materials about the effects of smoking on the heart. AHA also has developed a guidebook for incorporating a weight-control component into smoking cessation programs.

4. American Lung Association, 1740 Broadway, New York, New York 10019, (212) 245–8000

A voluntary organization of 7,500 members (physicians, nurses, and laypersons), the American Lung Association (ALA) conducts numerous public information programs about the health effects of smoking. ALA has 59 state and 85 local units. The organization actively supports legislation and information campaigns for non-smokers' rights and provides help for smokers who want to quit, for example, through ''Freedom From Smoking,'' a self-help smoking cessation program.

5. Office on Smoking and Health, U.S. Department of Health and Human Services, 5600 Fishers Lane, Park Building, Room 110, Rockville, Maryland 20857

The Office on Smoking and Health (OSH) is the Department of Health and Human Services' lead agency in smoking control. OSH has sponsored distribution of publications on smoking-related topics, such as free flyers on relapse after initial quitting, helping a friend or family member quit smoking, the health hazards of smoking, and the effects of parental smoking on teenagers.

*In Hawaii, on Oahu call 524–1234 (call collect from neighboring islands),

Spanish-speaking staff members are available during daytime hours to callers from the following areas: California, Florida, Georgia, Illinois, New Jersey (area code 201), New York, and Texas. Consult your local telephone directory for listings of local chapters.

APPENDIX K TO § 1926.1101—POLARIZED LIGHT MICROSCOPY OF ASBESTOS (NON-MANDATORY)

Method number:

ID–191

Matrix: Bulk

Collection Procedure:

Collect approximately 1 to 2 grams of each type of material and place into separate 20 mL scintillation vials.

Analytical Procedure:

A portion of each separate phase is analyzed by gross examination, phase-polar examination, and central stop dispersion microscopy.

Commercial manufacturers and products mentioned in this method are for descriptive use only and do not constitute endorsements by USDOL-OSHA. Similar products from other sources may be substituted.

1. Introduction

This method describes the collection and analysis of asbestos bulk materials by light microscopy techniques including phase-polar illumination and central-stop dispersion microscopy. Some terms unique to asbestos analysis are defined below:

Amphibole: A family of minerals whose crystals are formed by long, thin units which have two thin ribbons of double chain silicate with a brucite ribbon in between. The shape of each unit is similar to an ''I beam''. Minerals important in asbestos analysis include cummingtonite-grunerite, crocidolite, tremolite-actinolite and anthophyllite.

Asbestos: A term for naturally occurring fibrous minerals. Asbestos includes chrysotile, cummingtonite-grunerite asbestos (amosite), anthophyllite asbestos, tremolite asbestos, crocidolite, actinolite asbestos and any of these minerals which have been chemically treated or altered. The precise chemical formulation of each species varies with the location from which it was mined. Nominal compositions are listed:

Chrysotile.....$Mg_3 Si_2 O_5(OH)_4$
Crocidolite (Riebeckite asbestos).....$Na_2 Fe_3 2+Fe_2 3+Si_8 O_{22}(OH)_2$
Cummingtonite-Grunerite asbestos (Amosite).....$(Mg,Fe)_7 Si_8 O_{22}(OH)_2$
Tremolite-Actinolite asbestos .....$Ca_2(Mg,Fe)_5 Si_8 O_{22}(OH)_2$
Anthophyllite asbestos.....$(Mg,Fe)_7 Si_8 O_{22}(OH)_2$

Asbestos Fiber: A fiber of asbestos meeting the criteria for a fiber. (See section 3.5. of this Appendix)

Aspect Ratio: The ratio of the length of a fiber to its diameter usually defined as ''length : width'', e.g. 3:1.

Brucite: A sheet mineral with the composition $Mg(OH)_2$.

Central Stop Dispersion Staining (microscope): This is a dark field microscope technique that images particles using only light refracted by the particle, excluding light that travels through the particle unrefracted. This is usually accomplished with a McCrone objective or other arrangement which places

a circular stop with apparent aperture equal to the objective aperture in the back focal plane of the microscope.

Cleavage Fragments: Mineral particles formed by the comminution of minerals, especially those characterized by relatively parallel sides and moderate aspect ratio.

Differential Counting: The term applied to the practice of excluding certain kinds of fibers from a phase contrast asbestos count because they are not asbestos.

Fiber: A particle longer than or equal to 5 μm with a length to width ratio greater than or equal to 3:1. This may include cleavage fragments. (see section 3.5 of this appendix).

Phase Contrast: Contrast obtained in the microscope by causing light scattered by small particles to destructively interfere with unscattered light, thereby enhancing the visibility of very small particles and particles with very low intrinsic contrast.

Phase Contrast Microscope: A microscope configured with a phase mask pair to create phase contrast. The technique which uses this is called Phase Contrast Microscopy (PCM).

Phase-Polar Analysis: This is the use of polarized light in a phase contrast microscope. It is used to see the same size fibers that are visible in air filter analysis. Although fibers finer than 1 μm are visible, analysis of these is inferred from analysis of larger bundles that are usually present.

Phase-Polar Microscope: The phase-polar microscope is a phase contrast microscope which has an analyzer, a polarizer, a first order red plate and a rotating phase condenser all in place so that the polarized light image is enhanced by phase contrast.

Sealing Encapsulant: This is a product which can be applied, preferably by spraying, onto an asbestos surface which will seal the surface so that fibers cannot be released.

Serpentine: A mineral family consisting of minerals with the general composition $Mg_3(Si_2\ O_5(OH)_4$ having the magnesium in brucite layer over a silicate layer. Minerals important in asbestos analysis included in this family are chrysotile, lizardite, antigorite.

1.1. History

Light microscopy has been used for well over 100 years for the determination of mineral species. This analysis is carried out using specialized polarizing microscopes as well as bright field microscopes. The identification of minerals is an on-going process with many new minerals described each year. The first recorded use of asbestos was in Finland about 2500 B.C. where the material was used in the mud wattle for the wooden huts the people lived in as well as strengthening for pottery. Adverse health aspects of the mineral were noted nearly 2000 years ago when Pliny the Younger wrote about the poor health of slaves in the asbestos mines. Although known to be injurious for centuries, the first modern references to its toxicity were by the British Labor Inspectorate when it banned asbestos dust from the workplace in 1898. Asbestosis cases were described in the literature after the turn of the century. Cancer was first suspected in the mid 1930's and a causal link to mesothelioma was made in 1965. Because of the public concern for worker and public safety with the use of this material, several different types of analysis were applied to the determination of asbestos content. Light microscopy requires a great deal of experience and craft. Attempts were made to apply less subjective methods to the analysis. X-ray diffraction was partially successful in determining the mineral types but was unable to separate out the fibrous portions from the non-fibrous portions. Also, the minimum detection limit for asbestos analysis by X-ray diffraction (XRD) is about 1%. Differential Thermal Analysis (DTA) was no more successful. These provide useful corroborating information when the presence of asbestos has been shown by microscopy; however, neither can determine the difference between fibrous and non-fibrous minerals when both habits are present. The same is true of Infrared Absorption (IR).

When electron microscopy was applied to asbestos analysis, hundreds of fibers were discovered present too small to be visible in any light microscope. There are two different types of electron microscope used for asbestos analysis: Scanning Electron Microscope (SEM) and Transmission Electron Microscope (TEM). Scanning Electron Microscopy is useful in identifying minerals. The SEM can provide two of the three pieces of information required to identify fibers by electron microscopy: morphology and chemistry. The third is structure as determined by Selected Area Electron Diffraction—SAED which is performed in the TEM. Although the resolution of the SEM is sufficient for very fine fibers to be seen, accuracy of chemical analysis that can be performed on the fibers varies with fiber diameter in fibers of less than 0.2 μm diameter. The TEM is a powerful tool to identify fibers too small to be resolved by light microscopy and should be used in conjunction with this method when necessary. The TEM can provide all three pieces of information required for fiber identification. Most fibers thicker than 1 μm can adequately be defined in the light microscope. The light microscope remains as the best instrument for the determination of mineral type. This is because the minerals under investigation were first described analytically with the light microscope. It is inexpensive and gives positive identification for most samples analyzed.

Further, when optical techniques are inadequate, there is ample indication that alternative techniques should be used for complete identification of the sample.

1.2. Principle

Minerals consist of atoms that may be arranged in random order or in a regular arrangement. Amorphous materials have atoms in random order while crystalline materials have long range order. Many materials are transparent to light, at least for small particles or for thin sections. The properties of these materials can be investigated by the effect that the material has on light passing through it. The six asbestos minerals are all crystalline with particular properties that have been identified and cataloged. These six minerals are anisotropic. They have a regular array of atoms, but the arrangement is not the same in all directions. Each major direction of the crystal presents a different regularity. Light photons travelling in each of these main directions will encounter different electrical neighborhoods, affecting the path and time of travel. The techniques outlined in this method use the fact that light traveling through fibers or crystals in different directions will behave differently, but predictably. The behavior of the light as it travels through a crystal can be measured and compared with known or determined values to identify the mineral species. Usually, Polarized Light Microscopy (PLM) is performed with strain-free objectives on a bright-field microscope platform. This would limit the resolution of the microscope to about 0.4 μm. Because OSHA requires the counting and identification of fibers visible in phase contrast, the phase contrast platform is used to visualize the fibers with the polarizing elements added into the light path. Polarized light methods cannot identify fibers finer than about 1 μm in diameter even though they are visible. The finest fibers are usually identified by inference from the presence of larger, identifiable fiber bundles. When fibers are present, but not identifiable by light microscopy, use either SEM or TEM to determine the fiber identity.

1.3. Advantages and Disadvantages

The advantages of light microcopy are:

(a) Basic identification of the materials was first performed by light microscopy and gross analysis. This provides a large base of published information against which to check analysis and analytical technique.

(b) The analysis is specific to fibers. The minerals present can exist in asbestiform, fibrous, prismatic, or massive varieties all at the same time. Therefore, bulk methods of analysis such as X-ray diffraction, IR analysis, DTA, etc. are inappropriate where the material is not known to be fibrous.

(c) The analysis is quick, requires little preparation time, and can be performed onsite if a suitably equipped microscope is available.

The disadvantages are:

(a) Even using phase-polar illumination, not all the fibers present may be seen. This is a problem for very low asbestos concentrations where agglomerations or large bundles of fibers may not be present to allow identification by inference.

(b) The method requires a great degree of sophistication on the part of the microscopist. An analyst is only as useful as his mental catalog of images. Therefore, a microscopist's accuracy is enhanced by experience. The mineralogical training of the analyst is very important. It is the basis on which subjective decisions are made.

(c) The method uses only a tiny amount of material for analysis. This may lead to sampling bias and false results (high or low). This is especially true if the sample is severely inhomogeneous.

(d) Fibers may be bound in a matrix and not distinguishable as fibers so identification cannot be made.

1.4. Method Performance

1.4.1. This method can be used for determination of asbestos content from 0 to 100% asbestos. The detection limit has not been adequately determined, although for selected samples, the limit is very low, depending on the number of particles examined. For mostly homogeneous, finely divided samples, with no difficult fibrous interferences, the detection limit is below 1%. For inhomogeneous samples (most samples), the detection limit remains undefined. NIST has conducted proficiency testing of laboratories on a national scale. Although each round is reported statistically with an average, control limits, etc., the results indicate a difficulty in establishing precision especially in the low concentration range. It is suspected that there is significant bias in the low range especially near 1%. EPA tried to remedy this by requiring a mandatory point counting scheme for samples less than 10%. The point counting procedure is tedious, and may introduce significant biases of its own. It has not been incorporated into this method.

1.4.2. The precision and accuracy of the quantitation tests performed in this method are unknown. Concentrations are easier to determine in commercial products where asbestos was deliberately added because the amount is usually more than a few percent. An analyst's results can be ''calibrated'' against the known amounts added by the manufacturer. For geological samples, the degree of homogeneity affects the precision.

1.4.3. The performance of the method is analyst dependent. The analyst must choose carefully and not necessarily randomly the portions for analysis to assure that detection

of asbestos occurs when it is present. For this reason, the analyst must have adequate training in sample preparation, and experience in the location and identification of asbestos in samples. This is usually accomplished through substantial on-the-job training as well as formal education in mineralogy and microscopy.

1.5. Interferences

Any material which is long, thin, and small enough to be viewed under the microscope can be considered an interference for asbestos. There are literally hundreds of interferences in workplaces. The techniques described in this method are normally sufficient to eliminate the interferences. An analyst's success in eliminating the interferences depends on proper training.

Asbestos minerals belong to two mineral families: the serpentines and the amphiboles. In the serpentine family, the only common fibrous mineral is chrysotile. Occasionally, the mineral antigorite occurs in a fibril habit with morphology similar to the amphiboles. The amphibole minerals consist of a score of different minerals of which only five are regulated by federal standard: amosite, crocidolite, anthophyllite asbestos, tremolite asbestos and actinolite asbestos. These are the only amphibole minerals that have been commercially exploited for their fibrous properties; however, the rest can and do occur occasionally in asbestiform habit.

In addition to the related mineral interferences, other minerals common in building material may present a problem for some microscopists: gypsum, anhydrite, brucite, quartz fibers, talc fibers or ribbons, wollastonite, perlite, attapulgite, etc. Other fibrous materials commonly present in workplaces are: fiberglass, mineral wool, ceramic wool, refractory ceramic fibers, kevlar, nomex, synthetic fibers, graphite or carbon fibers, cellulose (paper or wood) fibers, metal fibers, etc.

Matrix embedding material can sometimes be a negative interference. The analyst may not be able to easily extract the fibers from the matrix in order to use the method. Where possible, remove the matrix before the analysis, taking careful note of the loss of weight. Some common matrix materials are: vinyl, rubber, tar, paint, plant fiber, cement, and epoxy. A further negative interference is that the asbestos fibers themselves may be either too small to be seen in Phase contrast Microscopy (PCM) or of a very low fibrous quality, having the appearance of plant fibers. The analyst's ability to deal with these materials increases with experience.

1.6. Uses and Occupational Exposure

Asbestos is ubiquitous in the environment. More than 40% of the land area of the United States is composed of minerals which may contain asbestos. Fortunately, the actual formation of great amounts of asbestos is relatively rare. Nonetheless, there are locations in which environmental exposure can be severe such as in the Serpentine Hills of California.

There are thousands of uses for asbestos in industry and the home. Asbestos abatement workers are the most current segment of the population to have occupational exposure to great amounts of asbestos. If the material is undisturbed, there is no exposure. Exposure occurs when the asbestos-containing material is abraded or otherwise disturbed during maintenance operations or some other activity. Approximately 95% of the asbestos in place in the United States is chrysotile.

Amosite and crocidolite make up nearly all the difference. Tremolite and anthophyllite make up a very small percentage. Tremolite is found in extremely small amounts in certain chrysotile deposits. Actinolite exposure is probably greatest from environmental sources, but has been identified in vermiculite containing, sprayed-on insulating materials which may have been certified as asbestos-free.

1.7. Physical and Chemical Properties

The nominal chemical compositions for the asbestos minerals were given in Section 1. Compared to cleavage fragments of the same minerals, asbestiform fibers possess a high tensile strength along the fiber axis. They are chemically inert, non-combustible, and heat resistant. Except for chrysotile, they are insoluble in Hydrochloric acid (HCl). Chrysotile is slightly soluble in HCl. Asbestos has high electrical resistance and good sound absorbing characteristics. It can be woven into cables, fabrics or other textiles, or matted into papers, felts, and mats.

1.8. Toxicology (This section is for Information Only and Should Not Be Taken as OSHA Policy)

Possible physiologic results of respiratory exposure to asbestos are mesothelioma of the pleura or peritoneum, interstitial fibrosis, asbestosis, pneumoconiosis, or respiratory cancer. The possible consequences of asbestos exposure are detailed in the NIOSH Criteria Document or in the OSHA Asbestos Standards 29 CFR 1910.1001 and 29 CFR 1926.1101 and 29 CFR 1915.1001.

2. Sampling Procedure

2.1. Equipment for sampling

(a) Tube or cork borer sampling device
(b) Knife
(c) 20 mL scintillation vial or similar vial
(d) Sealing encapsulant

2.2. Safety Precautions

Asbestos is a known carcinogen. Take care when sampling. While in an asbestos-containing atmosphere, a properly selected and fit-tested respirator should be worn. Take samples in a manner to cause the least amount of dust. Follow these general guidelines:

(a) Do not make unnecessary dust.

(b) Take only a small amount (1 to 2 g).

(c) Tightly close the sample container.

(d) Use encapsulant to seal the spot where the sample was taken, if necessary.

2.3. Sampling Procedure

Samples of any suspect material should be taken from an inconspicuous place. Where the material is to remain, seal the sampling wound with an encapsulant to eliminate the potential for exposure from the sample site. Microscopy requires only a few milligrams of material. The amount that will fill a 20 mL scintillation vial is more than adequate. Be sure to collect samples from all layers and phases of material. If possible, make separate samples of each different phase of the material. This will aid in determining the actual hazard. *DO NOT USE ENVELOPES, PLASTIC OR PAPER BAGS OF ANY KIND TO COLLECT SAMPLES.* The use of plastic bags presents a contamination hazard to laboratory personnel and to other samples. When these containers are opened, a bellows effect blows fibers out of the container onto everything, including the person opening the container.

If a cork-borer type sampler is available, push the tube through the material all the way, so that all layers of material are sampled. Some samplers are intended to be disposable. These should be capped and sent to the laboratory. If a non-disposable cork borer is used, empty the contents into a scintillation vial and send to the laboratory. Vigorously and completely clean the cork borer between samples.

2.4 Shipment

Samples packed in glass vials must not touch or they might break in shipment.

(a) Seal the samples with a sample seal over the end to guard against tampering and to identify the sample.

(b) Package the bulk samples in separate packages from the air samples. They may cross-contaminate each other and will invalidate the results of the air samples.

(c) Include identifying paperwork *with* the samples, but not in contact with the suspected asbestos.

(d) To maintain sample accountability, ship the samples by certified mail, overnight express, or hand carry them to the laboratory.

3. Analysis

The analysis of asbestos samples can be divided into two major parts: sample preparation and microscopy. Because of the different asbestos uses that may be encountered by the analyst, each sample may need different preparation steps. The choices are outlined below. There are several different tests that are performed to identify the asbestos species and determine the percentage. They will be explained below.

3.1. Safety

(a) Do not create unnecessary dust. Handle the samples in HEPA-filter equipped hoods. If samples are received in bags, envelopes or other inappropriate container, open them only in a hood having a face velocity at or greater than 100 fpm. Transfer a small amount to a scintillation vial and only handle the smaller amount.

(b) Open samples in a hood, never in the open lab area.

(c) Index of refraction oils can be toxic. Take care not to get this material on the skin. Wash immediately with soap and water if this happens.

(d) Samples that have been heated in the muffle furnace or the drying oven may be hot. Handle them with tongs until they are cool enough to handle.

(e) Some of the solvents used, such as THF (tetrahydrofuran), are toxic and should only be handled in an appropriate fume hood and according to instructions given in the Material Safety Data Sheet (MSDS).

3.2. Equipment

(a) Phase contrast microscope with 10x, 16x and 40x objectives, 10x wide-field eyepieces, G–22 Walton-Beckett graticule, Whipple disk, polarizer, analyzer and first order red or gypsum plate, 100 Watt illuminator, rotating position condenser with oversize phase rings, central stop dispersion objective, Kohler illumination and a rotating mechanical stage.

(b) Stereo microscope with reflected light illumination, transmitted light illumination, polarizer, analyzer and first order red or gypsum plate, and rotating stage.

(c) Negative pressure hood for the stereo microscope

(d) Muffle furnace capable of 600 °C

(e) Drying oven capable of 50–150 °C

(f) Aluminum specimen pans

(g) Tongs for handling samples in the furnace

(h) High dispersion index of refraction oils (Special for dispersion staining.)

n = 1.550
n = 1.585
n = 1.590
n = 1.605
n = 1.620
n = 1.670

n = 1.680
n = 1.690

(i) A set of index of refraction oils from about n=1.350 to n=2.000 in n=0.005 increments. (Standard for Becke line analysis.)

(j) Glass slides with painted or frosted ends 1×3 inches 1mm (thick, precleaned.

(k) Cover Slips 22×22 mm, #1½

(l) Paper clips or dissection needles

(m) Hand grinder

(n) Scalpel with both #10 and #11 blades

(o) 0.1 molar HCl

(p) Decalcifying solution (Baxter Scientific Products) Ethylenediaminetetraacetic Acid, Tetrasodium .....0.7 g/l
Sodium Potassium Tartrate .....8.0 mg/liter
Hydrochloric Acid .....99.2 g/liter
Sodium Tartrate.....0.14 g/liter

(q) Tetrahydrofuran (THF)

(r) Hotplate capable of 60 °C

(s) Balance

(t) Hacksaw blade

(u) Ruby mortar and pestle

3.3. Sample Pre-Preparation

Sample preparation begins with pre-preparation which may include chemical reduction of the matrix, heating the sample to dryness or heating in the muffle furnace. The end result is a sample which has been reduced to a powder that is sufficiently fine to fit under the cover slip. Analyze different phases of samples separately, e.g., tile and the tile mastic should be analyzed separately as the mastic may contain asbestos while the tile may not.

(a) *Wet Samples*

Samples with a high water content will not give the proper dispersion colors and must be dried prior to sample mounting. Remove the lid of the scintillation vial, place the bottle in the drying oven and heat at 100 °C to dryness (usually about 2 h). Samples which are not submitted to the lab in glass must be removed and placed in glass vials or aluminum weighing pans before placing them in the drying oven.

(b) *Samples With Organic Interference—Muffle Furnace*

These may include samples with tar as a matrix, vinyl asbestos tile, or any other organic that can be reduced by heating. Remove the sample from the vial and weigh in a balance to determine the weight of the submitted portion. Place the sample in a muffle furnace at 500 °C for 1 to 2 h or until all obvious organic material has been removed. Retrieve, cool and weigh again to determine the weight loss on ignition. This is necessary to determine the asbestos content of the submitted sample, because the analyst will be looking at a reduced sample.

NOTE: Heating above 600 °C will cause the sample to undergo a structural change which, given sufficient time, will convert the chrysotile to forsterite. Heating even at lower temperatures for 1 to 2 h may have a measurable effect on the optical properties of the minerals. If the analyst is unsure of what to expect, a sample of standard asbestos should be heated to the same temperature for the same length of time so that it can be examined for the proper interpretation.

(c) *Samples With Organic Interference—THF*

Vinyl asbestos tile is the most common material treated with this solvent, although, substances containing tar will sometimes yield to this treatment. Select a portion of the material and then grind it up if possible. Weigh the sample and place it in a test tube. Add sufficient THF to dissolve the organic matrix. This is usually about 4 to 5 mL. *Remember, THF is highly flammable.* Filter the remaining material through a tared silver membrane, dry and weigh to determine how much is left after the solvent extraction. Further process the sample to remove carbonate or mount directly.

(d) *Samples With Carbonate Interference*

Carbonate material is often found on fibers and sometimes must be removed in order to perform dispersion microscopy. Weigh out a portion of the material and place it in a test tube. Add a sufficient amount of 0.1 M HCl or decalcifying solution in the tube to react all the carbonate as evidenced by gas formation; i.e., when the gas bubbles stop, add a little more solution. If no more gas forms, the reaction is complete. Filter the material out through a tared silver membrane, dry and weigh to determine the weight lost.

3.4. Sample Preparation

Samples must be prepared so that accurate determination can be made of the asbestos type and amount present. The following steps are carried out in the low-flow hood (a low-flow hood has less than 50 fpm flow):

(1) If the sample has large lumps, is hard, or cannot be made to lie under a cover slip, the grain size must be reduced. Place a small amount between two slides and grind the material between them or grind a small amount in a clean mortar and pestle. The choice of whether to use an alumina, ruby, or diamond mortar depends on the hardness of the material. Impact damage can alter the asbestos mineral if too much mechanical shock occurs. (Freezer mills can completely destroy the observable crystallinity of asbestos and should not be used). For some samples, a portion of material can be shaved off with a scalpel, ground off with a hand grinder or hack saw blade.

The preparation tools should either be disposable or cleaned thoroughly. Use vigorous scrubbing to loosen the fibers during the washing. Rinse the implements with copious amounts of water and air-dry in a dust-free environment.

(2) If the sample is powder or has been reduced as in (1) above, it is ready to mount. Place a glass slide on a piece of optical tissue and write the identification on the painted or frosted end. Place two drops of index of refraction medium n=1.550 on the slide. (The medium n=1.550 is chosen because it is the matching index for chrysotile. Dip the end of a clean paper-clip or dissecting needle into the droplet of refraction medium *on the slide* to moisten it. Then dip the probe into the powder sample. Transfer what sticks on the probe to the slide. The material on the end of the probe should have a diameter of about 3 mm for a good mount. If the material is very fine, less sample may be appropriate. For non-powder samples such as fiber mats, forceps should be used to transfer a small amount of material to the slide. Stir the material in the medium on the slide, spreading it out and making the preparation as uniform as possible. Place a cover-slip on the preparation by gently lowering onto the slide and allowing it to fall ''trapdoor'' fashion on the preparation to push out any bubbles. Press gently on the cover slip to even out the distribution of particulate on the slide. If there is insufficient mounting oil on the slide, one or two drops may be placed near the edge of the coverslip on the slide. Capillary action will draw the necessary amount of liquid into the preparation. Remove excess oil with the point of a laboratory wiper.

Treat at least two different areas of each phase in this fashion. Choose representative areas of the sample. It may be useful to select particular areas or fibers for analysis. This is useful to identify asbestos in severely inhomogeneous samples.

When it is determined that amphiboles may be present, repeat the above process using the appropriate high-dispersion oils until an identification is made or all six asbestos minerals have been ruled out. Note that percent determination must be done in the index medium 1.550 because amphiboles tend to disappear in their matching mediums.

3.5. Analytical procedure

NOTE: This method presumes some knowledge of mineralogy and optical petrography.

The analysis consists of three parts: The determination of whether there is asbestos present, what type is present and the determination of how much is present. The general flow of the analysis is:

(1) Gross examination.

(2) Examination under polarized light on the stereo microscope.

(3) Examination by phase-polar illumination on the compound phase microscope.

(4) Determination of species by dispersion stain. Examination by Becke line analysis may also be used; however, this is usually more cumbersome for asbestos determination.

(5) Difficult samples may need to be analyzed by SEM or TEM, or the results from those techniques combined with light microscopy for a definitive identification.

Identification of a particle as asbestos requires that it be asbestiform. Description of particles should follow the suggestion of Campbell. (Figure 1)

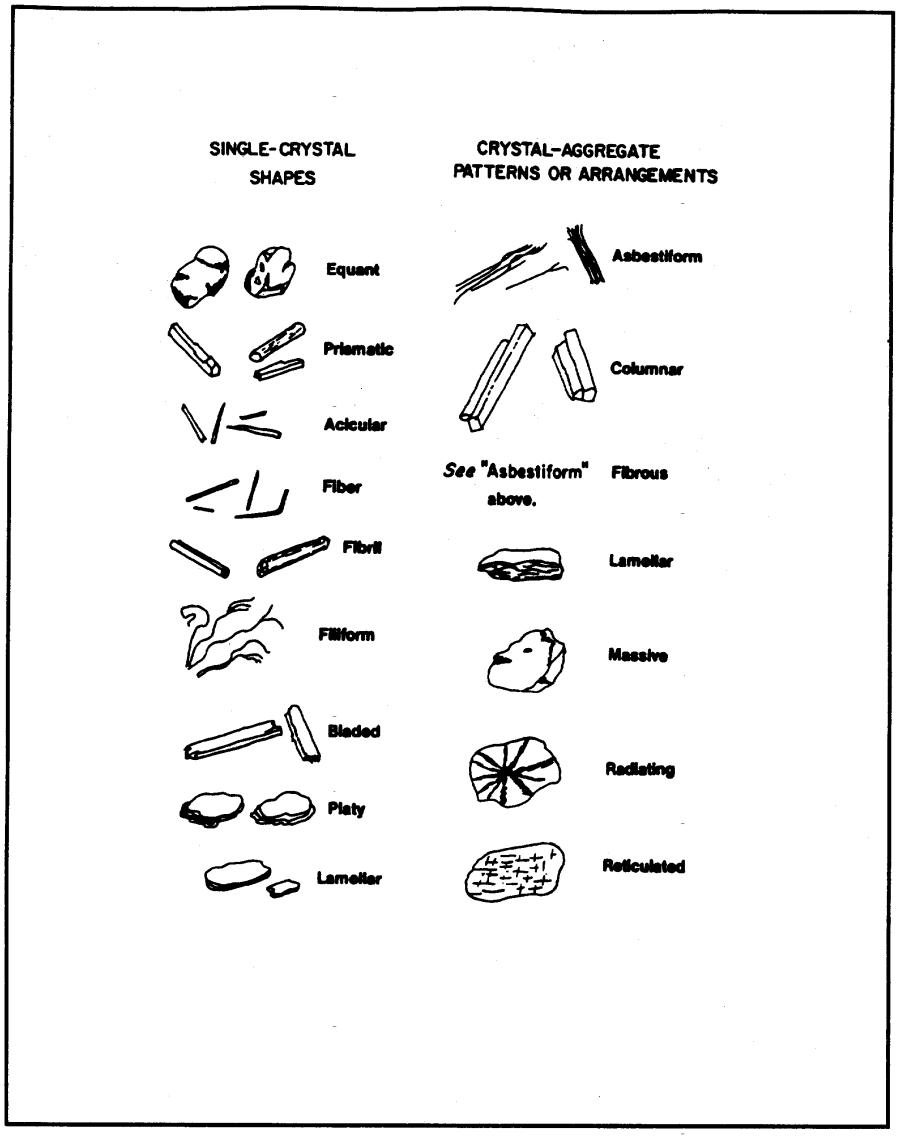


Figure 1. Particle definitions showing mineral growth habits. From the U.S. Bureau of Mines

For the purpose of regulation, the mineral must be one of the six minerals covered and must be in the asbestos growth habit. Large specimen samples of asbestos generally have the gross appearance of wood. Fibers are easily parted from it. Asbestos fibers are very long compared with their widths. The fibers have a very high tensile strength as demonstrated by bending without breaking. Asbestos fibers exist in bundles that are easily

parted, show longitudinal fine structure and may be tufted at the ends showing ''bundle of sticks'' morphology. In the microscope some of these properties may not be observable. Amphiboles do not always show striations along their length even when they are asbestos. Neither will they always show tufting. They generally do not show a curved nature except for very long fibers. Asbestos and asbestiform minerals are usually characterized in groups by extremely high aspect ratios (greater than 100:1). While aspect ratio analysis is useful for characterizing populations of fibers, it cannot be used to identify individual fibers of intermediate to short aspect ratio. Observation of many fibers is often necessary to determine whether a sample consists of ''cleavage fragments'' or of asbestos fibers.

Most cleavage fragments of the asbestos minerals are easily distinguishable from true asbestos fibers. This is because true cleavage fragments usually have larger diameters than 1 μm. Internal structure of particles larger than this usually shows them to have no internal fibrillar structure. In addition, cleavage fragments of the monoclinic amphiboles show inclined extinction under crossed polars with no compensator. Asbestos fibers usually show extinction at zero degrees or ambiguous extinction if any at all. Morphologically, the larger cleavage fragments are obvious by their blunt or stepped ends showing prismatic habit. Also, they tend to be acicular rather than filiform.

Where the particles are less than 1 μm in diameter and have an aspect ratio greater than or equal to 3:1, it is recommended that the sample be analyzed by SEM or TEM if there is any question whether the fibers are cleavage fragments or asbestiform particles.

Care must be taken when analyzing by electron microscopy because the interferences are different from those in light microscopy and may structurally be very similar to asbestos. The classic interference is between anthophyllite and biopyribole or intermediate fiber. Use the same morphological clues for electron microscopy as are used for light microscopy, e.g. fibril splitting, internal longitudinal striation, fraying, curvature, etc.

(1) Gross examination:

Examine the sample, preferably in the glass vial. Determine the presence of any obvious fibrous component. Estimate a percentage based on previous experience and current observation. Determine whether any pre-preparation is necessary. Determine the number of phases present. This step may be carried out or augmented by observation at 6 to 40× under a stereo microscope.

(2) After performing any necessary pre-preparation, prepare slides of each phase as described above. Two preparations of the same phase in the same index medium can be made side-by-side on the same glass for convenience. Examine with the polarizing stereo microscope. Estimate the percentage of asbestos based on the amount of birefringent fiber present.

(3) Examine the slides on the phase-polar microscopes at magnifications of 160 and 400×. Note the morphology of the fibers. Long, thin, very straight fibers with little curvature are indicative of fibers from the amphibole family. Curved, wavy fibers are usually indicative of chrysotile. Estimate the percentage of asbestos on the phase-polar microscope under conditions of crossed polars and a gypsum plate. Fibers smaller than 1.0 μm in thickness must be identified by inference to the presence of larger, identifiable fibers and morphology. If no larger fibers are visible, electron microscopy should be performed. At this point, only a tentative identification can be made. Full identification must be made with dispersion microscopy. Details of the tests are included in the appendices.

(4) Once fibers have been determined to be present, they must be identified. Adjust the microscope for dispersion mode and observe the fibers. The microscope has a rotating stage, one polarizing element, and a system for generating dark-field dispersion microscopy (see Section 4.6. of this appendix). Align a fiber with its length parallel to the polarizer and note the color of the Becke lines. Rotate the stage to bring the fiber length perpendicular to the polarizer and note the color. Repeat this process for every fiber or fiber bundle examined. The colors must be consistent with the colors generated by standard asbestos reference materials for a positive identification. In n=1.550, amphiboles will generally show a yellow to straw-yellow color indicating that the fiber indices of refraction are higher than the liquid. If long, thin fibers are noted and the colors are yellow, prepare further slides as above in the suggested matching liquids listed below:

Type of asbestos	Index of refraction
Chrysotile	n=1.550.
Amosite	n=1.670 or 1.680.
Crocidolite	n=1.690.
Anthophyllite	n=1.605 and 1.620.
Tremolite	n=1.605 and 1.620.
Actinolite	n=1.620.

Where more than one liquid is suggested, the first is preferred; however, in some cases this liquid will not give good dispersion color. Take care to avoid interferences in the other liquid; e.g., wollastonite in n=1.620 will give the same colors as tremolite. In n=1.605 wollastonite will appear yellow in all directions. Wollastonite may be determined under crossed polars as it will change from blue to yellow as it is rotated along its fiber axis by tapping on the cover slip. Asbestos minerals will not change in this way.

Determination of the angle of extinction may, when present, aid in the determination of anthophyllite from tremolite. True asbestos fibers usually have 0° extinction or ambiguous extinction, while cleavage fragments have more definite extinction.

Continue analysis until both preparations have been examined and all present species of asbestos are identified. If there are no fibers present, or there is less than 0.1% present, end the analysis with the minimum number of slides (2).

(5) Some fibers have a coating on them which makes dispersion microscopy very difficult or impossible. Becke line analysis or electron microscopy may be performed in those cases. Determine the percentage by light microscopy. TEM analysis tends to overestimate the actual percentage present.

(6) Percentage determination is an estimate of occluded area, tempered by gross observation. Gross observation information is used to make sure that the high magnification microscopy does not greatly over- or under- estimate the amount of fiber present. This part of the analysis requires a great deal of experience. Satisfactory models for asbestos content analysis have not yet been developed, although some models based on metallurgical grain-size determination have found some utility. Estimation is more easily handled in situations where the grain sizes visible at about 160× are about the same and the sample is relatively homogeneous.

View all of the area under the cover slip to make the percentage determination. View the fields while moving the stage, paying attention to the clumps of material. These are not usually the best areas to perform dispersion microscopy because of the interference from other materials. But, they are the areas most likely to represent the accurate percentage in the sample. Small amounts of asbestos require slower scanning and more frequent analysis of individual fields.

Report the area occluded by asbestos as the concentration. This estimate does not generally take into consideration the difference in density of the different species present in the sample. For most samples this is adequate. Simulation studies with similar materials must be carried out to apply microvisual estimation for that purpose and is beyond the scope of this procedure.

(7) Where successive concentrations have been made by chemical or physical means, the amount reported is the percentage of the material in the ''as submitted'' or original state. The percentage determined by microscopy is multiplied by the fractions remaining after pre-preparation steps to give the percentage in the original sample. For example:

Step 1. 60% remains after heating at 550 °C for 1 h.

Step 2. 30% of the residue of step 1 remains after dissolution of carbonate in 0.1 m HCl.

Step 3. Microvisual estimation determines that 5% of the sample is chrysotile asbestos.

The reported result is:

R = (Microvisual result in percent) × (Fraction remaining after step 2) × (Fraction remaining of original sample after step 1)

R = (5)×(.30)×(.60)=0.9%

(8) Report the percent and type of asbestos present. For samples where asbestos was identified, but is less than 1.0%, report ''Asbestos present, less than 1.0%.'' There must have been at least two observed fibers or fiber bundles in the two preparations to be reported as present. For samples where asbestos was not seen, report as ''None Detected.''

Auxiliary Information

Because of the subjective nature of asbestos analysis, certain concepts and procedures need to be discussed in more depth. This information will help the analyst understand why some of the procedures are carried out the way they are.

4.1. Light

Light is electromagnetic energy. It travels from its source in packets called quanta. It is instructive to consider light as a plane wave. The light has a direction of travel. Perpendicular to this and mutually perpendicular to each other, are two vector components. One is the magnetic vector and the other is the electric vector. We shall only be concerned with the electric vector. In this description, the interaction of the vector and the mineral will describe all the observable phenomena. From a light source such a microscope illuminator, light travels in all different direction from the filament.

In any given direction away from the filament, the electric vector is perpendicular to the direction of travel of a light ray. While perpendicular, its orientation is random about the travel axis. If the electric vectors from all the light rays were lined up by passing the light through a filter that would only let light rays with electric vectors oriented in one direction pass, the light would then be *POLARIZED*.

Polarized light interacts with matter in the direction of the electric vector. This is the polarization direction. Using this property it is possible to use polarized light to probe different materials and identify them by how they interact with light.

The speed of light in a vacuum is a constant at about 2.99×10^8 m/s. When light travels in different materials such as air, water, minerals or oil, it does not travel at this speed. It travels slower. This slowing is a function of both the material through which the light is traveling and the wavelength or frequency of the light. In general, the more

dense the material, the slower the light travels. Also, generally, the higher the frequency, the slower the light will travel. The ratio of the speed of light in a vacuum to that in a material is called the index of refraction (n). It is usually measured at 589 nm (the sodium D line). If white light (light containing all the visible wavelengths) travels through a material, rays of longer wavelengths will travel faster than those of shorter wavelengths, this separation is called dispersion. Dispersion is used as an identifier of materials as described in Section 4.6.

4.2. Material Properties

Materials are either amorphous or crystalline. The difference between these two descriptions depends on the positions of the atoms in them. The atoms in amorphous materials are randomly arranged with no long range order. An example of an amorphous material is glass. The atoms in crystalline materials, on the other hand, are in regular arrays and have long range order. Most of the atoms can be found in highly predictable locations. Examples of crystalline material are salt, gold, and the asbestos minerals.

It is beyond the scope of this method to describe the different types of crystalline materials that can be found, or the full description of the classes into which they can fall. However, some general crystallography is provided below to give a foundation to the procedures described.

With the exception of anthophyllite, all the asbestos minerals belong to the monoclinic crystal type. The unit cell is the basic repeating unit of the crystal and for monoclinic crystals can be described as having three unequal sides, two 90° angles and one angle not equal to 90°. The orthorhombic group, of which anthophyllite is a member has three unequal sides and three 90° angles. The unequal sides are a consequence of the complexity of fitting the different atoms into the unit cell. Although the atoms are in a regular array, that array is not symmetrical in all directions. There is long range order in the three major directions of the crystal. However, the order is different in each of the three directions. This has the effect that the index of refraction is different in each of the three directions. Using polarized light, we can investigate the index of refraction in each of the directions and identify the mineral or material under investigation. The indices α, β, and γ are used to identify the lowest, middle, and highest index of refraction respectively. The x direction, associated with α is called the fast axis. Conversely, the z direction is associated with γ and is the slow direction. Crocidolite has α along the fiber length making it ''length-fast''. The remainder of the asbestos minerals have the γ axis along the fiber length. They are called ''length-slow''. This orientation to fiber length is used to aid in the identification of asbestos.

4.3. Polarized Light Technique

Polarized light microscopy as described in this section uses the phase-polar microscope described in Section 3.2. A phase contrast microscope is fitted with two polarizing elements, one below and one above the sample. The polarizers have their polarization directions at right angles to each other. Depending on the tests performed, there may be a compensator between these two polarizing elements. A compensator is a piece of mineral with known properties that ''compensates'' for some deficiency in the optical train. Light emerging from a polarizing element has its electric vector pointing in the polarization direction of the element. The light will not be subsequently transmitted through a second element set at a right angle to the first element. Unless the light is altered as it passes from one element to the other, there is no transmission of light.

4.4. Angle of Extinction

Crystals which have different crystal regularity in two or three main directions are said to be anisotropic. They have a different index of refraction in each of the main directions. When such a crystal is inserted between the crossed polars, the field of view is no longer dark but shows the crystal in color. The color depends on the properties of the crystal. The light acts as if it travels through the crystal along the optical axes. If a crystal optical axis were lined up along one of the polarizing directions (either the polarizer or the analyzer) the light would appear to travel only in that direction, and it would blink out or go dark. The difference in degrees between the fiber direction and the angle at which it blinks out is called the angle of extinction. When this angle can be measured, it is useful in identifying the mineral. The procedure for measuring the angle of extinction is to first identify the polarization direction in the microscope. A commercial alignment slide can be used to establish the polarization directions or use anthophyllite or another suitable mineral. This mineral has a zero degree angle of extinction and will go dark to extinction as it aligns with the polarization directions. When a fiber of anthophyllite has gone to extinction, align the eyepiece reticle or graticule with the fiber so that there is a visual cue as to the direction of polarization in the field of view. Tape or otherwise secure the eyepiece in this position so it will not shift.

After the polarization direction has been identified in the field of view, move the particle of interest to the center of the field of

view and align it with the polarization direction. For fibers, align the fiber along this direction. Note the angular reading of the rotating stage. Looking at the particle, rotate the stage until the fiber goes dark or ''blinks out''. Again note the reading of the stage. The difference in the first reading and the second is an angle of extinction.

The angle measured may vary as the orientation of the fiber changes about its long axis. Tables of mineralogical data usually report the maximum angle of extinction. Asbestos forming minerals, when they exhibit an angle of extinction, usually do show an angle of extinction close to the reported maximum, or as appropriate depending on the substitution chemistry.

4.5. Crossed Polars with Compensator

When the optical axes of a crystal are not lined up along one of the polarizing directions (either the polarizer or the analyzer) part of the light travels along one axis and part travels along the other visible axis. This is characteristic of birefringent materials.

The color depends on the difference of the two visible indices of refraction and the thickness of the crystal. The maximum difference available is the difference between the α and the γ axes. This maximum difference is usually tabulated as the birefringence of the crystal.

For this test, align the fiber at 45° to the polarization directions in order to maximize the contribution to each of the optical axes. The colors seen are called retardation colors. They arise from the recombination of light which has traveled through the two separate directions of the crystal. One of the rays is retarded behind the other since the light in that direction travels slower. On recombination, some of the colors which make up white light are enhanced by constructive interference and some are suppressed by destructive interference. The result is a color dependent on the difference between the indices and the thickness of the crystal. The proper colors, thicknesses, and retardations are shown on a Michel-Levy chart. The three items, retardation, thickness and birefringence are related by the following relationship:

$R=t(n_\gamma - n_\alpha)$

R=retardation, t=crystal thickness in μm, and

$n_{\alpha,\gamma}$=indices of refraction.

Examination of the equation for asbestos minerals reveals that the visible colors for almost all common asbestos minerals and fiber sizes are shades of gray and black. The eye is relatively poor at discriminating different shades of gray. It is very good at discriminating different colors. In order to compensate for the low retardation, a compensator is added to the light train between the polarization elements. The compensator used for this test is a gypsum plate of known thickness and birefringence. Such a compensator when oriented at 45° to the polarizer direction, provides a retardation of 530 nm of the 530 nm wavelength color. This enhances the red color and gives the background a characteristic red to red-magenta color. If this ''full-wave'' compensator is in place when the asbestos preparation is inserted into the light train, the colors seen on the fibers are quite different. Gypsum, like asbestos has a fast axis and a slow axis. When a fiber is aligned with its fast axis in the same direction as the fast axis of the gypsum plate, the ray vibrating in the slow direction is retarded by both the asbestos and the gypsum. This results in a higher retardation than would be present for either of the two minerals. The color seen is a second order blue. When the fiber is rotated 90° using the rotating stage, the slow direction of the fiber is now aligned with the fast direction of the gypsum and the fast direction of the fiber is aligned with the slow direction of the gypsum. Thus, one ray vibrates faster in the fast direction of the gypsum, and slower in the slow direction of the fiber; the other ray will vibrate slower in the slow direction of the gypsum and faster in the fast direction of the fiber. In this case, the effect is subtractive and the color seen is a first order yellow. As long as the fiber thickness does not add appreciably to the color, the same basic colors will be seen for all asbestos types except crocidolite. In crocidolite the colors will be weaker, may be in the opposite directions, and will be altered by the blue absorption color natural to crocidolite. Hundreds of other materials will give the same colors as asbestos, and therefore, this test is not definitive for asbestos. The test is useful in discriminating against fiberglass or other amorphous fibers such as some synthetic fibers. Certain synthetic fibers will show retardation colors different than asbestos; however, there are some forms of polyethylene and aramid which will show morphology and retardation colors similar to asbestos minerals. This test must be supplemented with a positive identification test when birefringent fibers are present which can not be excluded by morphology. This test is relatively ineffective for use on fibers less than 1 μm in diameter. For positive confirmation TEM or SEM should be used if no larger bundles or fibers are visible.

4.6. Dispersion Staining

Dispersion microscopy or dispersion staining is the method of choice for the identification of asbestos in bulk materials. Becke line analysis is used by some laboratories and yields the same results as does dispersion staining for asbestos and can be used in lieu of dispersion staining. Dispersion staining is performed on the same platform as the

phase-polar analysis with the analyzer and compensator removed. One polarizing element remains to define the direction of the light so that the different indices of refraction of the fibers may be separately determined. Dispersion microscopy is a dark-field technique when used for asbestos. Particles are imaged with scattered light. Light which is unscattered is blocked from reaching the eye either by the back field image mask in a McCrone objective or a back field image mask in the phase condenser. The most convenient method is to use the rotating phase condenser to move an oversized phase ring into place. The ideal size for this ring is for the central disk to be just larger than the objective entry aperture as viewed in the back focal plane. The larger the disk, the less scattered light reaches the eye. This will have the effect of diminishing the intensity of dispersion color and will shift the actual color seen. The colors seen vary even on microscopes from the same manufacturer. This is due to the different bands of wavelength exclusion by different mask sizes. The mask may either reside in the condenser or in the objective back focal plane. It is imperative that the analyst determine by experimentation with asbestos standards what the appropriate colors should be for each asbestos type. The colors depend also on the temperature of the preparation and the exact chemistry of the asbestos. Therefore, some slight differences from the standards should be allowed. This is not a serious problem for commercial asbestos uses. This technique is used for identification of the indices of refraction for fibers by recognition of color. There is no direct numerical readout of the index of refraction. Correlation of color to actual index of refraction is possible by referral to published conversion tables. This is not necessary for the analysis of asbestos. Recognition of appropriate colors along with the proper morphology are deemed sufficient to identify the commercial asbestos minerals. Other techniques including SEM, TEM, and XRD may be required to provide additional information in order to identify other types of asbestos.

Make a preparation in the suspected matching high dispersion oil, e.g., n=1.550 for chrysotile. Perform the preliminary tests to determine whether the fibers are birefringent or not. Take note of the morphological character. Wavy fibers are indicative of chrysotile while long, straight, thin, frayed fibers are indicative of amphibole asbestos. This can aid in the selection of the appropriate matching oil. The microscope is set up and the polarization direction is noted as in Section 4.4. Align a fiber with the polarization direction. Note the color. This is the color parallel to the polarizer. Then rotate the fiber rotating the stage 90° so that the polarization direction is across the fiber. This is the perpendicular position. Again note the color. Both colors must be consistent with standard asbestos minerals in the correct direction for a positive identification of asbestos. If only one of the colors is correct while the other is not, the identification is not positive. If the colors in both directions are bluish-white, the analyst has chosen a matching index oil which is higher than the correct matching oil, e.g. the analyst has used n=1.620 where chrysotile is present. The next lower oil (Section 3.5.) should be used to prepare another specimen. If the color in both directions is yellow-white to straw-yellow-white, this indicates that the index of the oil is lower than the index of the fiber, e.g. the preparation is in n=1.550 while anthophyllite is present. Select the next higher oil (Section 3.5.) and prepare another slide. Continue in this fashion until a positive identification of all asbestos species present has been made or all possible asbestos species have been ruled out by negative results in this test. Certain plant fibers can have similar dispersion colors as asbestos. Take care to note and evaluate the morphology of the fibers or remove the plant fibers in pre-preparation. Coating material on the fibers such as carbonate or vinyl may destroy the dispersion color. Usually, there will be some outcropping of fiber which will show the colors sufficient for identification. When this is not the case, treat the sample as described in Section 3.3. and then perform dispersion staining. Some samples will yield to Becke line analysis if they are coated or electron microscopy can be used for identification.

5. References

5.1. Crane, D.T., *Asbestos in Air*, OSHA method ID160, Revised November 1992.

5.2. Ford, W.E., *Dana's Textbook of Mineralogy;* Fourth Ed.; John Wiley and Son, New York, 1950, p. vii.

5.3. Selikoff, I.J., Lee, D.H.K., *Asbestos and Disease,* Academic Press, New York, 1978, pp. 3,20.

5.4. *Women Inspectors of Factories*. Annual Report for 1898, H.M. Statistical Office, London, p. 170 (1898).

5.5. Selikoff,.I.J., Lee, D.H.K., *Asbestos and Disease,* Academic Press, New York, 1978, pp. 26,30.

5.6. Campbell, W.J., et al, *Selected Silicate Minerals and Their Asbestiform Varieties,* United States Department of the Interior, Bureau of Mines, Information Circular 8751, 1977.

5.7. *Asbestos,* Code of Federal Regulations, 29 CFR 1910.1001 and 29 CFR 1926.58.

5.8. *National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP Revision,* FEDERAL REGISTER, Vol. 55, No. 224, 20 November 1990, p. 48410.

5.9. Ross, M. *The Asbestos Minerals: Definitions, Description, Modes of Formation, Physical and Chemical Properties and Health Risk*

to the Mining Community, Nation Bureau of Standards Special Publication, Washington, DC, 1977.

5.10. Lilis, R., Fibrous Zeolites and Endemic Mesothelioma in Cappadocia, Turkey, *J. Occ Medicine*, 1981, 23,(8),548–550.

5.11. *Occupational Exposure to Asbestos—1972*, U.S. Department of Health Education and Welfare, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, HSM–72–10267.

5.12. Campbell,W.J., et al, Relationship of Mineral Habit to Size *Characteristics for Tremolite Fragments and Fibers*, United States Department of the Interior, Bureau of Mines, Information Circular 8367, 1979.

5.13. Mefford, D., DCM Laboratory, Denver, private communication, July 1987.

5.14. Deer, W.A., Howie, R.A., Zussman, J., *Rock Forming Minerals*, Longman, Thetford, UK, 1974.

5.15. Kerr, P.F., *Optical Mineralogy;* Third Ed. McGraw-Hill, New York, 1959.

5.16. Veblen, D.R. (Ed.), *Amphiboles and Other Hydrous Pyriboles—Mineralogy*, *Reviews in Mineralogy*, Vol 9A, Michigan, 1982, pp 1–102.

5.17. Dixon, W.C., *Applications of Optical Microscopy in the Analysis of Asbestos* and Quartz, ACS Symposium Series, No. 120, Analytical Techniques in Occupational Health Chemistry, 1979.

5.18. Polarized Light Microscopy, McCrone Research Institute, Chicago, 1976.

5.19. Asbestos Identification, McCrone Research Institute, G & G printers, Chicago, 1987.

5.20. McCrone, W.C., Calculation of Refractive Indices from Dispersion Staining Data, The Microscope, No 37, Chicago, 1989.

5.21. Levadie, B. (Ed.), *Asbestos and Other Health Related Silicates,* ASTM Technical Publication 834, ASTM, Philadelphia 1982.

5.22. Steel, E. and Wylie, A., Riordan, P.H. (Ed.), Mineralogical Characteristics of Asbestos, *Geology of Asbestos Deposits,* pp. 93–101, SME-AIME, 1981.

5.23. Zussman, J., The Mineralogy of Asbestos, *Asbestos: Properties, Applications and Hazards,* pp. 45–67 Wiley, 1979.

[51 FR 22756, June 20, 1986]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §1926.1101, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.fdsys.gov.

EFFECTIVE DATE NOTE: At 76 FR 33611, June 8, 2011, §1926.1101 was amended by removing paragraph (n)(7)(iii); revising paragraphs (n)(7)(ii) and (n)(8), effective July 8, 2011. For the convenience of the user, the revised text is set forth as follows:

§ 1926.1101 Asbestos

* * * * *

(n) * * *

(7) * * *

(ii) The employer must comply with the requirements concerning availability of records set forth in 29 CFR 1910.1020.

(8) *Transfer of records.* The employer must comply with the requirements concerning transfer of records set forth in 29 CFR 1910.1020(h).

* * * * *

§ 1926.1102 Coal tar pitch volatiles; interpretation of term.

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.1002 of this chapter.

[61 FR 31433, June 20, 1996]

§ 1926.1103 13 carcinogens (4-Nitrobiphenyl, etc.).

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.1003 of this chapter.

[61 FR 31433, June 20, 1996]

§ 1926.1104 alpha-Naphthylamine.

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.1003 of this chapter.

[61 FR 31433, June 20, 1996]

§ 1926.1105 [Reserved]

§ 1926.1106 Methyl chloromethyl ether.

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.1003 of this chapter.

[61 FR 31433, June 20, 1996]

§ 1926.1107 3,3′-Dichlorobenzidiene (and its salts).

NOTE: The requirements applicable to construction work under this section are identical to those set forth at §1910.1003 of this chapter.

[61 FR 31433, June 20, 1996]

SUMMARY OF THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION'S (OSHA)

HAZARD COMUNICATION STANDARD (HAZCOM) (29 CFR 1926.59)

Background

The HazCom (or right-to-know) is one of OSHA's most significant workplace regulations. It has two broad requirements:

1. Chemical manufacturers must:
    - Evaluate their products.
    - Label those which are hazardous.
    - Provide detailed hazard information to their commercial customers.
2. Employers who use hazardous materials must:
    - Inform their employees of hazards.
    - Train them to work safely with toxic substances.

The purpose of the HazCom is to inform workers and others exposed to certain toxic substances of the health risks associated with them. The Standard is not intended to limit production, use, or distribution of the chemicals.

Who/What is Covered?

The Standard applies to almost every organization – those who actually produce chemicals and those who use them.

In general, the HazCom covers any chemical, including those in mixtures known to be in the workplace where workers would be exposed to them under normal conditions. Chemicals used as paint strippers, for example, would be covered.

Workers also must be trained for emergency situations.

Compliance

To be in compliance, the employer must develop a compliance program which includes these key elements:

- Hazard Determination
- Written Compliance Plan
- Warning Labels
- Material Safety Data Sheets
- Employee Training

These elements are described in the following:

1. Hazard Determination

A key step in the development of a Material Safety Data Sheet (MSDS) and the labels for containers is a determination of which chemicals are hazardous and why they are hazardous. Three sources list hazardous chemicals:

- OSHA 29 CFR 1910, Subpart 2, Toxic and Hazardous Substances
- American Conference of Governmental Industrial Hygienists (ACGIH) – Threshold Limit Values (TLVs)
- NIOSH Pocket Guide to Chemical Hazards

If a chemical is listed in any of these sources, it is considered hazardous. Also, if a chemical is known to possibly cause cancer, that fact must be included on the MSDS.

2. Written Compliance Program

The written hazard communication program will be part of your overall worker training plan. It should be easy to implement and describe to an OSHA inspector. It should include:

- Program introduction
- Program management (including the role of the supervisor)
- Participating personnel
- Hazardous locations
- Hazardous chemical listing
- Hazard labeling
- MSDSs
- Training programs
- Trade secret access
- Documentation
- Program evaluation/quality assurance

3. Warning Labels

Hazardous chemical containers must have the following information labeled, tagged or marked on them before they are put into use. You also must label "secondary" containers which hold substances that have been taken out of their original manufacturer's container.

- Identity of hazardous chemicals.
- Appropriate hazard warnings.
- Name and address of chemical manufacturer, importer, distributor, or other responsible party.

OSHA accepts other systems for in-plant labeling (e.g., using numbers or other methods to categorize hazards). However, if such systems are used, worker training must stress the target organ effects of the chemicals.

4. Material Safety Data Sheets (MSDS)

MSDSs are covered in detail in the "Hazard Recognition" section of this manual.

5. Employee Information and Training

OSHA's requirements for employee training are specific, but flexible, to allow a company to have a program specific to its operation. Basic training should cover.

- HazCom explanation
- Training requirements of the law
- Company training program
- Company HazCom explanation and location
- Where to find the chemical inventory
- Locations of hazardous chemicals
- Description of labeling systems
- MSDS descriptions and their location (examples of MSDSs of particular relevance to lead abatement are presented in Section E)

Community Right to Know

This Standard affects a facility's obligation under the Emergency Planning and Community Right-to-Know Act. All employers required to prepare or have available MSDS's for hazardous substances in their workplaces must submit MSDSs and chemical hazard information to state and local authorities, including emergency responders. OSHA has regional coordinators who may provide information on the Hazard Communication Standard in your state.

of a currently effective determination by the Assistant Secretary of Labor that such program is compatible with the requirements of this section. Such determinations currently are in effect only in the States of Alabama, Arkansas, California, Kansas, Kentucky, Florida, Mississippi, New Hampshire, New York, North Carolina, Texas, Tennessee, Oregon, Idaho, Arizona, Colorado, Louisiana, Nebraska, Washington, Maryland, North Dakota, South Carolina, and Georgia.

[39 FR 23502, June 27, 1974, as amended at 43 FR 49746, Oct. 24, 1978; 43 FR 51759, Nov. 7, 1978; 49 FR 18295, Apr. 30, 1984; 58 FR 35309, June 30, 1993. Redesignated at 61 FR 31430, June 20, 1996]

§ 1910.1200 Hazard communication.

(a) *Purpose.* (1) The purpose of this section is to ensure that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees. This transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, material safety data sheets and employee training.

(2) This occupational safety and health standard is intended to address comprehensively the issue of evaluating the potential hazards of chemicals, and communicating information concerning hazards and appropriate protective measures to employees, and to preempt any legal requirements of a state, or political subdivision of a state, pertaining to this subject. Evaluating the potential hazards of chemicals, and communicating information concerning hazards and appropriate protective measures to employees, may include, for example, but is not limited to, provisions for: developing and maintaining a written hazard communication program for the workplace, including lists of hazardous chemicals present; labeling of containers of chemicals in the workplace, as well as of containers of chemicals being shipped to other workplaces; preparation and distribution of material safety data sheets to employees and downstream employers; and development and implementation of employee training programs regarding hazards of chemicals and protective measures. Under section 18 of the Act, no state or political subdivision of a state may adopt or enforce, through any court or agency, any requirement relating to the issue addressed by this Federal standard, except pursuant to a Federally-approved state plan.

(b) *Scope and application.* (1) This section requires chemical manufacturers or importers to assess the hazards of chemicals which they produce or import, and all employers to provide information to their employees about the hazardous chemicals to which they are exposed, by means of a hazard communication program, labels and other forms of warning, material safety data sheets, and information and training. In addition, this section requires distributors to transmit the required information to employers. (Employers who do not produce or import chemicals need only focus on those parts of this rule that deal with establishing a workplace program and communicating information to their workers. Appendix E of this section is a general guide for such employers to help them determine their compliance obligations under the rule.)

(2) This section applies to any chemical which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.

(3) This section applies to laboratories only as follows:

(i) Employers shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced;

(ii) Employers shall maintain any material safety data sheets that are received with incoming shipments of hazardous chemicals, and ensure that they are readily accessible during each workshift to laboratory employees when they are in their work areas;

(iii) Employers shall ensure that laboratory employees are provided information and training in accordance with paragraph (h) of this section, except for the location and availability of the written hazard communication program under paragraph (h)(2)(iii) of this section; and,

(iv) Laboratory employers that ship hazardous chemicals are considered to be either a chemical manufacturer or a distributor under this rule, and thus must ensure that any containers of hazardous chemicals leaving the laboratory are labeled in accordance with paragraph (f)(1) of this section, and that a material safety data sheet is provided to distributors and other employers in accordance with paragraphs (g)(6) and (g)(7) of this section.

(4) In work operations where employees only handle chemicals in sealed containers which are not opened under normal conditions of use (such as are found in marine cargo handling, warehousing, or retail sales), this section applies to these operations only as follows:

(i) Employers shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced;

(ii) Employers shall maintain copies of any material safety data sheets that are received with incoming shipments of the sealed containers of hazardous chemicals, shall obtain a material safety data sheet as soon as possible for sealed containers of hazardous chemicals received without a material safety data sheet if an employee requests the material safety data sheet, and shall ensure that the material safety data sheets are readily accessible during each work shift to employees when they are in their work area(s); and,

(iii) Employers shall ensure that employees are provided with information and training in accordance with paragraph (h) of this section (except for the location and availability of the written hazard communication program under paragraph (h)(2)(iii) of this section), to the extent necessary to protect them in the event of a spill or leak of a hazardous chemical from a sealed container.

(5) This section does not require labeling of the following chemicals:

(i) Any pesticide as such term is defined in the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 *et seq.*), when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Environmental Protection Agency;

(ii) Any chemical substance or mixture as such terms are defined in the Toxic Substances Control Act (15 U.S.C. 2601 *et seq.*), when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Environmental Protection Agency.

(iii) Any food, food additive, color additive, drug, cosmetic, or medical or veterinary device or product, including materials intended for use as ingredients in such products (*e.g.* flavors and fragrances), as such terms are defined in the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301 *et seq.*) or the Virus-Serum-Toxin Act of 1913 (21 U.S.C. 151 *et seq.*), and regulations issued under those Acts, when they are subject to the labeling requirements under those Acts by either the Food and Drug Administration or the Department of Agriculture;

(iv) Any distilled spirits (beverage alcohols), wine, or malt beverage intended for nonindustrial use, as such terms are defined in the Federal Alcohol Administration Act (27 U.S.C. 201 *et seq.*) and regulations issued under that Act, when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Bureau of Alcohol, Tobacco, and Firearms;

(v) Any consumer product or hazardous substance as those terms are defined in the Consumer Product Safety Act (15 U.S.C. 2051 *et seq.*) and Federal Hazardous Substances Act (15 U.S.C. 1261 *et seq.*) respectively, when subject to a consumer product safety standard or labeling requirement of those Acts, or regulations issued under those Acts by the Consumer Product Safety Commission; and,

(vi) Agricultural or vegetable seed treated with pesticides and labeled in accordance with the Federal Seed Act (7 U.S.C. 1551 *et seq.*) and the labeling regulations issued under that Act by the Department of Agriculture.

(6) This section does not apply to: (i) Any hazardous waste as such term is defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6901 *et seq.*), when subject to regulations issued under that Act by the Environmental Protection Agency;

(ii) Any hazardous substance as such term is defined by the Comprehensive Environmental Response, Compensation and Liability ACT (CERCLA) (42 U.S.C. 9601 *et seq.*) when the hazardous substance is the focus of remedial or removal action being conducted under CERCLA in accordance with Environmental Protection Agency regulations;

(iii) Tobacco or tobacco products;

(iv) Wood or wood products, including lumber which will not be processed, where the chemical manufacturer or importer can establish that the only hazard they pose to employees is the potential for flammability or combustibility (wood or wood products which have been treated with a hazardous chemical covered by this standard, and wood which may be subsequently sawed or cut, generating dust, are not exempted);

(v) Articles (as that term is defined in paragraph (c) of this section);

(vi) Food or alcoholic beverages which are sold, used, or prepared in a retail establishment (such as a grocery store, restaurant, or drinking place), and foods intended for personal consumption by employees while in the workplace;

(vii) Any drug, as that term is defined in the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301 *et seq.*), when it is in solid, final form for direct administration to the patient (*e.g.*, tablets or pills); drugs which are packaged by the chemical manufacturer for sale to consumers in a retail establishment (*e.g.*, over-the-counter drugs); and drugs intended for personal consumption by employees while in the workplace (*e.g.*, first aid supplies);

(viii) Cosmetics which are packaged for sale to consumers in a retail establishment, and cosmetics intended for personal consumption by employees while in the workplace;

(ix) Any consumer product or hazardous substance, as those terms are defined in the Consumer Product Safety Act (15 U.S.C. 2051 *et seq.*) and Federal Hazardous Substances Act (15 U.S.C. 1261 *et seq.*) respectively, where the employer can show that it is used in the workplace for the purpose intended by the chemical manufacturer or importer of the product, and the use results in a duration and frequency of exposure which is not greater than the range of exposures that could reasonably be experienced by consumers when used for the purpose intended;

(x) Nuisance particulates where the chemical manufacturer or importer can establish that they do not pose any physical or health hazard covered under this section;

(xi) Ionizing and nonionizing radiation; and,

(xii) Biological hazards.

(c) *Definitions. Article* means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, *e.g.*, minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Chemical means any element, chemical compound or mixture of elements and/or compounds.

Chemical manufacturer means an employer with a workplace where chemical(s) are produced for use or distribution.

Chemical name means the scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS) rules of nomenclature, or a name which will clearly identify the chemical for the purpose of conducting a hazard evaluation.

Combustible liquid means any liquid having a flashpoint at or above 100 °F (37.8 °C), but below 200 °F (93.3 °C), except any mixture having components with flashpoints of 200 °F (93.3 °C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

Commercial account means an arrangement whereby a retail distributor sells hazardous chemicals to an employer, generally in large quantities

over time and/or at costs that are below the regular retail price.

Common name means any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a chemical other than by its chemical name.

Compressed gas means:

(i) A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 °F (21.1 °C); or

(ii) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 °F (54.4 °C) regardless of the pressure at 70 °F (21.1 °C); or

(iii) A liquid having a vapor pressure exceeding 40 psi at 100 °F (37.8 °C) as determined by ASTM D–323–72.

Container means any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. For purposes of this section, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.

Designated representative means any individual or organization to whom an employee gives written authorization to exercise such employee's rights under this section. A recognized or certified collective bargaining agent shall be treated automatically as a designated representative without regard to written employee authorization.

Director means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Distributor means a business, other than a chemical manufacturer or importer, which supplies hazardous chemicals to other distributors or to employers.

Employee means a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies. Workers such as office workers or bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered.

Employer means a person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.

Explosive means a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

Exposure or *exposed* means that an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (*e.g.* accidental or possible) exposure. ''Subjected'' in terms of health hazards includes any route of entry (*e.g.* inhalation, ingestion, skin contact or absorption.)

Flammable means a chemical that falls into one of the following categories:

(i) *Aerosol, flammable* means an aerosol that, when tested by the method described in 16 CFR 1500.45, yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening;

(ii) *Gas, flammable* means: (A) A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of thirteen (13) percent by volume or less; or

(B) A gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than twelve (12) percent by volume, regardless of the lower limit;

(iii) *Liquid, flammable* means any liquid having a flashpoint below 100 °F (37.8 °C), except any mixture having components with flashpoints of 100 °F (37.8 °C) or higher, the total of which make up 99 percent or more of the total volume of the mixture.

(iv) *Solid, flammable* means a solid, other than a blasting agent or explosive as defined in § 1910.109(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

Flashpoint means the minimum temperature at which a liquid gives off a

vapor in sufficient concentration to ignite when tested as follows:

(i) Tagliabue Closed Tester (See American National Standard Method of Test for Flash Point by Tag Closed Tester, Z11.24–1979 (ASTM D 56–79)) for liquids with a viscosity of less than 45 Saybolt Universal Seconds (SUS) at 100 °F (37.8 °C), that do not contain suspended solids and do not have a tendency to form a surface film under test; or

(ii) Pensky-Martens Closed Tester (see American National Standard Method of Test for Flash Point by Pensky-Martens Closed Tester, Z11.7–1979 (ASTM D 93–79)) for liquids with a viscosity equal to or greater than 45 SUS at 100 °F (37.8 °C), or that contain suspended solids, or that have a tendency to form a surface film under test; or

(iii) Setaflash Closed Tester (see American National Standard Method of Test for Flash Point by Setaflash Closed Tester (ASTM D 3278–78)).

Organic peroxides, which undergo autoaccelerating thermal decomposition, are excluded from any of the flashpoint determination methods specified above.

Foreseeable emergency means any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace.

Hazardous chemical means any chemical which is a physical hazard or a health hazard.

Hazard warning means any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the specific physical and health hazard(s), including target organ effects, of the chemical(s) in the container(s). (See the definitions for ''physical hazard'' and ''health hazard'' to determine the hazards which must be covered.)

Health hazard means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term ''health hazard'' includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. Appendix A provides further definitions and explanations of the scope of health hazards covered by this section, and Appendix B describes the criteria to be used to determine whether or not a chemical is to be considered hazardous for purposes of this standard.

Identity means any chemical or common name which is indicated on the material safety data sheet (MSDS) for the chemical. The identity used shall permit cross-references to be made among the required list of hazardous chemicals, the label and the MSDS.

Immediate use means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

Importer means the first business with employees within the Customs Territory of the United States which receives hazardous chemicals produced in other countries for the purpose of supplying them to distributors or employers within the United States.

Label means any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.

Material safety data sheet (MSDS) means written or printed material concerning a hazardous chemical which is prepared in accordance with paragraph (g) of this section.

Mixture means any combination of two or more chemicals if the combination is not, in whole or in part, the result of a chemical reaction.

Organic peroxide means an organic compound that contains the bivalent -O-O-structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.

Oxidizer means a chemical other than a blasting agent or explosive as defined

in §1910.109(a), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

Physical hazard means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

Produce means to manufacture, process, formulate, blend, extract, generate, emit, or repackage.

Pyrophoric means a chemical that will ignite spontaneously in air at a temperature of 130 °F (54.4 °C) or below.

Responsible party means someone who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

Specific chemical identity means the chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.

Trade secret means any confidential formula, pattern, process, device, information or compilation of information that is used in an employer's business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it. Appendix D sets out the criteria to be used in evaluating trade secrets.

Unstable (reactive) means a chemical which in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure or temperature.

Use means to package, handle, react, emit, extract, generate as a byproduct, or transfer.

Water-reactive means a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

Work area means a room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.

Workplace means an establishment, job site, or project, at one geographical location containing one or more work areas.

(d) *Hazard determination.* (1) Chemical manufacturers and importers shall evaluate chemicals produced in their workplaces or imported by them to determine if they are hazardous. Employers are not required to evaluate chemicals unless they choose not to rely on the evaluation performed by the chemical manufacturer or importer for the chemical to satisfy this requirement.

(2) Chemical manufacturers, importers or employers evaluating chemicals shall identify and consider the available scientific evidence concerning such hazards. For health hazards, evidence which is statistically significant and which is based on at least one positive study conducted in accordance with established scientific principles is considered to be sufficient to establish a hazardous effect if the results of the study meet the definitions of health hazards in this section. Appendix A shall be consulted for the scope of health hazards covered, and Appendix B shall be consulted for the criteria to be followed with respect to the completeness of the evaluation, and the data to be reported.

(3) The chemical manufacturer, importer or employer evaluating chemicals shall treat the following sources as establishing that the chemicals listed in them are hazardous:

(i) 29 CFR part 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA); or,

(ii) *Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment*, American Conference of Governmental Industrial Hygienists (ACGIH) (latest edition). The chemical manufacturer, importer, or employer is still responsible for evaluating the hazards associated with the chemicals in these source lists in accordance with the requirements of this standard.

(4) Chemical manufacturers, importers and employers evaluating chemicals shall treat the following sources as establishing that a chemical is a carcinogen or potential carcinogen for hazard communication purposes:

(i) National Toxicology Program (NTP), *Annual Report on Carcinogens* (latest edition);

(ii) International Agency for Research on Cancer (IARC) *Monographs* (latest editions); or

(iii) 29 CFR part 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration.

NOTE: The *Registry of Toxic Effects of Chemical Substances* published by the National Institute for Occupational Safety and Health indicates whether a chemical has been found by NTP or IARC to be a potential carcinogen.

(5) The chemical manufacturer, importer or employer shall determine the hazards of mixtures of chemicals as follows:

(i) If a mixture has been tested as a whole to determine its hazards, the results of such testing shall be used to determine whether the mixture is hazardous;

(ii) If a mixture has not been tested as a whole to determine whether the mixture is a health hazard, the mixture shall be assumed to present the same health hazards as do the components which comprise one percent (by weight or volume) or greater of the mixture, except that the mixture shall be assumed to present a carcinogenic hazard if it contains a component in concentrations of 0.1 percent or greater which is considered to be a carcinogen under paragraph (d)(4) of this section;

(iii) If a mixture has not been tested as a whole to determine whether the mixture is a physical hazard, the chemical manufacturer, importer, or employer may use whatever scientifically valid data is available to evaluate the physical hazard potential of the mixture; and,

(iv) If the chemical manufacturer, importer, or employer has evidence to indicate that a component present in the mixture in concentrations of less than one percent (or in the case of carcinogens, less than 0.1 percent) could be released in concentrations which would exceed an established OSHA permissible exposure limit or ACGIH Threshold Limit Value, or could present a health risk to employees in those concentrations, the mixture shall be assumed to present the same hazard.

(6) Chemical manufacturers, importers, or employers evaluating chemicals shall describe in writing the procedures they use to determine the hazards of the chemical they evaluate. The written procedures are to be made available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director. The written description may be incorporated into the written hazard communication program required under paragraph (e) of this section.

(e) *Written hazard communication program.* (1) Employers shall develop, implement, and maintain at each workplace, a written hazard communication program which at least describes how the criteria specified in paragraphs (f), (g), and (h) of this section for labels and other forms of warning, material safety data sheets, and employee information and training will be met, and which also includes the following:

(i) A list of the hazardous chemicals known to be present using an identity that is referenced on the appropriate material safety data sheet (the list may be compiled for the workplace as a whole or for individual work areas); and,

(ii) The methods the employer will use to inform employees of the hazards of non-routine tasks (for example, the cleaning of reactor vessels), and the hazards associated with chemicals contained in unlabeled pipes in their work areas.

(2) *Multi-employer workplaces.* Employers who produce, use, or store hazardous chemicals at a workplace in such a way that the employees of other employer(s) may be exposed (for example, employees of a construction contractor working on-site) shall additionally ensure that the hazard communication programs developed and implemented under this paragraph (e) include the following:

(i) The methods the employer will use to provide the other employer(s) on-site access to material safety data sheets for each hazardous chemical the other employer(s)' employees may be exposed to while working;

(ii) The methods the employer will use to inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the workplace's normal operating conditions and in foreseeable emergencies; and,

(iii) The methods the employer will use to inform the other employer(s) of the labeling system used in the workplace.

(3) The employer may rely on an existing hazard communication program to comply with these requirements, provided that it meets the criteria established in this paragraph (e).

(4) The employer shall make the written hazard communication program available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director, in accordance with the requirements of 29 CFR 1910.20 (e).

(5) Where employees must travel between workplaces during a workshift, *i.e.,* their work is carried out at more than one geographical location, the written hazard communication program may be kept at the primary workplace facility.

(f) *Labels and other forms of warning.* (1) The chemical manufacturer, importer, or distributor shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked with the following information:

(i) Identity of the hazardous chemical(s);

(ii) Appropriate hazard warnings; and

(iii) Name and address of the chemical manufacturer, importer, or other responsible party.

(2)(i) For solid metal (such as a steel beam or a metal casting), solid wood, or plastic items that are not exempted as articles due to their downstream use, or shipments of whole grain, the required label may be transmitted to the customer at the time of the initial shipment, and need not be included with subsequent shipments to the same employer unless the information on the label changes;

(ii) The label may be transmitted with the initial shipment itself, or with the material safety data sheet that is to be provided prior to or at the time of the first shipment; and,

(iii) This exception to requiring labels on every container of hazardous chemicals is only for the solid material itself, and does not apply to hazardous chemicals used in conjunction with, or known to be present with, the material and to which employees handling the items in transit may be exposed (for example, cutting fluids or pesticides in grains).

(3) Chemical manufacturers, importers, or distributors shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged, or marked in accordance with this section in a manner which does not conflict with the requirements of the Hazardous Materials Transportation Act (49 U.S.C. 1801 *et seq.*) and regulations issued under that Act by the Department of Transportation.

(4) If the hazardous chemical is regulated by OSHA in a substance-specific health standard, the chemical manufacturer, importer, distributor or employer shall ensure that the labels or other forms of warning used are in accordance with the requirements of that standard.

(5) Except as provided in paragraphs (f)(6) and (f)(7) of this section, the employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the following information:

(i) Identity of the hazardous chemical(s) contained therein; and,

(ii) Appropriate hazard warnings, or alternatively, words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.

(6) The employer may use signs, placards, process sheets, batch tickets, operating procedures, or other such written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information required by paragraph (f)(5) of this section to be on a label. The written materials shall be readily accessible to the employees in their work area throughout each work shift.

(7) The employer is not required to label portable containers into which hazardous chemicals are transferred from labeled containers, and which are

intended only for the immediate use of the employee who performs the transfer. For purposes of this section, drugs which are dispensed by a pharmacy to a health care provider for direct administration to a patient are exempted from labeling.

(8) The employer shall not remove or deface existing labels on incoming containers of hazardous chemicals, unless the container is immediately marked with the required information.

(9) The employer shall ensure that labels or other forms of warning are legible, in English, and prominently displayed on the container, or readily available in the work area throughout each work shift. Employers having employees who speak other languages may add the information in their language to the material presented, as long as the information is presented in English as well.

(10) The chemical manufacturer, importer, distributor or employer need not affix new labels to comply with this section if existing labels already convey the required information.

(11) Chemical manufacturers, importers, distributors, or employers who become newly aware of any significant information regarding the hazards of a chemical shall revise the labels for the chemical within three months of becoming aware of the new information. Labels on containers of hazardous chemicals shipped after that time shall contain the new information. If the chemical is not currently produced or imported, the chemical manufacturer, importers, distributor, or employer shall add the information to the label before the chemical is shipped or introduced into the workplace again.

(g) *Material safety data sheets.* (1) Chemical manufacturers and importers shall obtain or develop a material safety data sheet for each hazardous chemical they produce or import. Employers shall have a material safety data sheet in the workplace for each hazardous chemical which they use.

(2) Each material safety data sheet shall be in English (although the employer may maintain copies in other languages as well), and shall contain at least the following information:

(i) The identity used on the label, and, except as provided for in paragraph (i) of this section on trade secrets:

(A) If the hazardous chemical is a single substance, its chemical and common name(s);

(B) If the hazardous chemical is a mixture which has been tested as a whole to determine its hazards, the chemical and common name(s) of the ingredients which contribute to these known hazards, and the common name(s) of the mixture itself; or,

(C) If the hazardous chemical is a mixture which has not been tested as a whole:

(*1*) The chemical and common name(s) of all ingredients which have been determined to be health hazards, and which comprise 1% or greater of the composition, except that chemicals identified as carcinogens under paragraph (d) of this section shall be listed if the concentrations are 0.1% or greater; and,

(*2*) The chemical and common name(s) of all ingredients which have been determined to be health hazards, and which comprise less than 1% (0.1% for carcinogens) of the mixture, if there is evidence that the ingredient(s) could be released from the mixture in concentrations which would exceed an established OSHA permissible exposure limit or ACGIH Threshold Limit Value, or could present a health risk to employees; and,

(*3*) The chemical and common name(s) of all ingredients which have been determined to present a physical hazard when present in the mixture;

(ii) Physical and chemical characteristics of the hazardous chemical (such as vapor pressure, flash point);

(iii) The physical hazards of the hazardous chemical, including the potential for fire, explosion, and reactivity;

(iv) The health hazards of the hazardous chemical, including signs and symptoms of exposure, and any medical conditions which are generally recognized as being aggravated by exposure to the chemical;

(v) The primary route(s) of entry;

(vi) The OSHA permissible exposure limit, ACGIH Threshold Limit Value, and any other exposure limit used or

recommended by the chemical manufacturer, importer, or employer preparing the material safety data sheet, where available;

(vii) Whether the hazardous chemical is listed in the National Toxicology Program (NTP) Annual Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions), or by OSHA;

(viii) Any generally applicable precautions for safe handling and use which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, including appropriate hygienic practices, protective measures during repair and maintenance of contaminated equipment, and procedures for clean-up of spills and leaks;

(ix) Any generally applicable control measures which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, such as appropriate engineering controls, work practices, or personal protective equipment;

(x) Emergency and first aid procedures;

(xi) The date of preparation of the material safety data sheet or the last change to it; and,

(xii) The name, address and telephone number of the chemical manufacturer, importer, employer or other responsible party preparing or distributing the material safety data sheet, who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

(3) If no relevant information is found for any given category on the material safety data sheet, the chemical manufacturer, importer or employer preparing the material safety data sheet shall mark it to indicate that no applicable information was found.

(4) Where complex mixtures have similar hazards and contents (i.e. the chemical ingredients are essentially the same, but the specific composition varies from mixture to mixture), the chemical manufacturer, importer or employer may prepare one material safety data sheet to apply to all of these similar mixtures.

(5) The chemical manufacturer, importer or employer preparing the material safety data sheet shall ensure that the information recorded accurately reflects the scientific evidence used in making the hazard determination. If the chemical manufacturer, importer or employer preparing the material safety data sheet becomes newly aware of any significant information regarding the hazards of a chemical, or ways to protect against the hazards, this new information shall be added to the material safety data sheet within three months. If the chemical is not currently being produced or imported the chemical manufacturer or importer shall add the information to the material safety data sheet before the chemical is introduced into the workplace again.

(6)(i) Chemical manufacturers or importers shall ensure that distributors and employers are provided an appropriate material safety data sheet with their initial shipment, and with the first shipment after a material safety data sheet is updated;

(ii) The chemical manufacturer or importer shall either provide material safety data sheets with the shipped containers or send them to the distributor or employer prior to or at the time of the shipment;

(iii) If the material safety data sheet is not provided with a shipment that has been labeled as a hazardous chemical, the distributor or employer shall obtain one from the chemical manufacturer or importer as soon as possible; and,

(iv) The chemical manufacturer or importer shall also provide distributors or employers with a material safety data sheet upon request.

(7)(i) Distributors shall ensure that material safety data sheets, and updated information, are provided to other distributors and employers with their initial shipment and with the first shipment after a material safety data sheet is updated;

(ii) The distributor shall either provide material safety data sheets with the shipped containers, or send them to the other distributor or employer prior to or at the time of the shipment;

(iii) Retail distributors selling hazardous chemicals to employers having

a commercial account shall provide a material safety data sheet to such employers upon request, and shall post a sign or otherwise inform them that a material safety data sheet is available;

(iv) Wholesale distributors selling hazardous chemicals to employers over-the-counter may also provide material safety data sheets upon the request of the employer at the time of the over-the-counter purchase, and shall post a sign or otherwise inform such employers that a material safety data sheet is available;

(v) If an employer without a commercial account purchases a hazardous chemical from a retail distributor not required to have material safety data sheets on file (*i.e.*, the retail distributor does not have commercial accounts and does not use the materials), the retail distributor shall provide the employer, upon request, with the name, address, and telephone number of the chemical manufacturer, importer, or distributor from which a material safety data sheet can be obtained;

(vi) Wholesale distributors shall also provide material safety data sheets to employers or other distributors upon request; and,

(vii) Chemical manufacturers, importers, and distributors need not provide material safety data sheets to retail distributors that have informed them that the retail distributor does not sell the product to commercial accounts or open the sealed container to use it in their own workplaces.

(8) The employer shall maintain in the workplace copies of the required material safety data sheets for each hazardous chemical, and shall ensure that they are readily accessible during each work shift to employees when they are in their work area(s). (Electronic access, microfiche, and other alternatives to maintaining paper copies of the material safety data sheets are permitted as long as no barriers to immediate employee access in each workplace are created by such options.)

(9) Where employees must travel between workplaces during a workshift, *i.e.*, their work is carried out at more than one geographical location, the material safety data sheets may be kept at the primary workplace facility. In this situation, the employer shall ensure that employees can immediately obtain the required information in an emergency.

(10) Material safety data sheets may be kept in any form, including operating procedures, and may be designed to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals. However, the employer shall ensure that in all cases the required information is provided for each hazardous chemical, and is readily accessible during each work shift to employees when they are in in their work area(s).

(11) Material safety data sheets shall also be made readily available, upon request, to designated representatives and to the Assistant Secretary, in accordance with the requirements of 29 CFR 1910.20(e). The Director shall also be given access to material safety data sheets in the same manner.

(h) *Employee information and training.* (1) Employers shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new physical or health hazard the employees have not previously been trained about is introduced into their work area. Information and training may be designed to cover categories of hazards (*e.g.*, flammability, carcinogenicity) or specific chemicals. Chemical-specific information must always be available through labels and material safety data sheets.

(2) *Information.* Employees shall be informed of:

(i) The requirements of this section;

(ii) Any operations in their work area where hazardous chemicals are present; and,

(iii) The location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and material safety data sheets required by this section.

(3) *Training.* Employee training shall include at least:

(i) Methods and observations that may be used to detect the presence or release of a hazardous chemical in the

work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);

(ii) The physical and health hazards of the chemicals in the work area;

(iii) The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and,

(iv) The details of the hazard communication program developed by the employer, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

(i) *Trade secrets.* (1) The chemical manufacturer, importer, or employer may withhold the specific chemical identity, including the chemical name and other specific identification of a hazardous chemical, from the material safety data sheet, provided that:

(i) The claim that the information withheld is a trade secret can be supported;

(ii) Information contained in the material safety data sheet concerning the properties and effects of the hazardous chemical is disclosed;

(iii) The material safety data sheet indicates that the specific chemical identity is being withheld as a trade secret; and,

(iv) The specific chemical identity is made available to health professionals, employees, and designated representatives in accordance with the applicable provisions of this paragraph.

(2) Where a treating physician or nurse determines that a medical emergency exists and the specific chemical identity of a hazardous chemical is necessary for emergency or first-aid treatment, the chemical manufacturer, importer, or employer shall immediately disclose the specific chemical identity of a trade secret chemical to that treating physician or nurse, regardless of the existence of a written statement of need or a confidentiality agreement. The chemical manufacturer, importer, or employer may require a written statement of need and confidentiality agreement, in accordance with the provisions of paragraphs (i) (3) and (4) of this section, as soon as circumstances permit.

(3) In non-emergency situations, a chemical manufacturer, importer, or employer shall, upon request, disclose a specific chemical identity, otherwise permitted to be withheld under paragraph (i)(1) of this section, to a health professional (i.e. physician, industrial hygienist, toxicologist, epidemiologist, or occupational health nurse) providing medical or other occupational health services to exposed employee(s), and to employees or designated representatives, if:

(i) The request is in writing;

(ii) The request describes with reasonable detail one or more of the following occupational health needs for the information:

(A) To assess the hazards of the chemicals to which employees will be exposed;

(B) To conduct or assess sampling of the workplace atmosphere to determine employee exposure levels;

(C) To conduct pre-assignment or periodic medical surveillance of exposed employees;

(D) To provide medical treatment to exposed employees;

(E) To select or assess appropriate personal protective equipment for exposed employees;

(F) To design or assess engineering controls or other protective measures for exposed employees; and,

(G) To conduct studies to determine the health effects of exposure.

(iii) The request explains in detail why the disclosure of the specific chemical identity is essential and that, in lieu thereof, the disclosure of the following information to the health professional, employee, or designated representative, would not satisfy the purposes described in paragraph (i)(3)(ii) of this section:

(A) The properties and effects of the chemical;

(B) Measures for controlling workers' exposure to the chemical;

(C) Methods of monitoring and analyzing worker exposure to the chemical; and,

(D) Methods of diagnosing and treating harmful exposures to the chemical;

(iv) The request includes a description of the procedures to be used to maintain the confidentiality of the disclosed information; and,

(v) The health professional, and the employer or contractor of the services of the health professional (i.e. downstream employer, labor organization, or individual employee), employee, or designated representative, agree in a written confidentiality agreement that the health professional, employee, or designated representative, will not use the trade secret information for any purpose other than the health need(s) asserted and agree not to release the information under any circumstances other than to OSHA, as provided in paragraph (i)(6) of this section, except as authorized by the terms of the agreement or by the chemical manufacturer, importer, or employer.

(4) The confidentiality agreement authorized by paragraph (i)(3)(iv) of this section:

(i) May restrict the use of the information to the health purposes indicated in the written statement of need;

(ii) May provide for appropriate legal remedies in the event of a breach of the agreement, including stipulation of a reasonable pre-estimate of likely damages; and,

(iii) May not include requirements for the posting of a penalty bond.

(5) Nothing in this standard is meant to preclude the parties from pursuing non-contractual remedies to the extent permitted by law.

(6) If the health professional, employee, or designated representative receiving the trade secret information decides that there is a need to disclose it to OSHA, the chemical manufacturer, importer, or employer who provided the information shall be informed by the health professional, employee, or designated representative prior to, or at the same time as, such disclosure.

(7) If the chemical manufacturer, importer, or employer denies a written request for disclosure of a specific chemical identity, the denial must:

(i) Be provided to the health professional, employee, or designated representative, within thirty days of the request;

(ii) Be in writing;

(iii) Include evidence to support the claim that the specific chemical identity is a trade secret;

(iv) State the specific reasons why the request is being denied; and,

(v) Explain in detail how alternative information may satisfy the specific medical or occupational health need without revealing the specific chemical identity.

(8) The health professional, employee, or designated representative whose request for information is denied under paragraph (i)(3) of this section may refer the request and the written denial of the request to OSHA for consideration.

(9) When a health professional, employee, or designated representative refers the denial to OSHA under paragraph (i)(8) of this section, OSHA shall consider the evidence to determine if:

(i) The chemical manufacturer, importer, or employer has supported the claim that the specific chemical identity is a trade secret;

(ii) The health professional, employee, or designated representative has supported the claim that there is a medical or occupational health need for the information; and,

(iii) The health professional, employee or designated representative has demonstrated adequate means to protect the confidentiality.

(10)(i) If OSHA determines that the specific chemical identity requested under paragraph (i)(3) of this section is not a *bona fide* trade secret, or that it is a trade secret, but the requesting health professional, employee, or designated representative has a legitimate medical or occupational health need for the information, has executed a written confidentiality agreement, and has shown adequate means to protect the confidentiality of the information, the chemical manufacturer, importer, or employer will be subject to citation by OSHA.

(ii) If a chemical manufacturer, importer, or employer demonstrates to OSHA that the execution of a confidentiality agreement would not provide

sufficient protection against the potential harm from the unauthorized disclosure of a trade secret specific chemical identity, the Assistant Secretary may issue such orders or impose such additional limitations or conditions upon the disclosure of the requested chemical information as may be appropriate to assure that the occupational health services are provided without an undue risk of harm to the chemical manufacturer, importer, or employer.

(11) If a citation for a failure to release specific chemical identity information is contested by the chemical manufacturer, importer, or employer, the matter will be adjudicated before the Occupational Safety and Health Review Commission in accordance with the Act's enforcement scheme and the applicable Commission rules of procedure. In accordance with the Commission rules, when a chemical manufacturer, importer, or employer continues to withhold the information during the contest, the Administrative Law Judge may review the citation and supporting documentation *in camera* or issue appropriate orders to protect the confidentiality of such matters.

(12) Notwithstanding the existence of a trade secret claim, a chemical manufacturer, importer, or employer shall, upon request, disclose to the Assistant Secretary any information which this section requires the chemical manufacturer, importer, or employer to make available. Where there is a trade secret claim, such claim shall be made no later than at the time the information is provided to the Assistant Secretary so that suitable determinations of trade secret status can be made and the necessary protections can be implemented.

(13) Nothing in this paragraph shall be construed as requiring the disclosure under any circumstances of process or percentage of mixture information which is a trade secret.

(j) *Effective dates.* Chemical manufacturers, importers, distributors, and employers shall be in compliance with all provisions of this section by March 11, 1994.

NOTE: The effective date of the clarification that the exemption of wood and wood products from the Hazard Communication standard in paragraph (b)(6)(iv) only applies to wood and wood products including lumber which will not be processed, where the manufacturer or importer can establish that the only hazard they pose to employees is the potential for flammability or combustibility, and that the exemption does not apply to wood or wood products which have been treated with a hazardous chemical covered by this standard, and wood which may be subsequently sawed or cut generating dust has been stayed from March 11, 1994 to August 11, 1994.

APPENDIX A TO § 1910.1200—HEALTH HAZARD DEFINITIONS (MANDATORY)

Although safety hazards related to the physical characteristics of a chemical can be objectively defined in terms of testing requirements (e.g. flammability), health hazard definitions are less precise and more subjective. Health hazards may cause measurable changes in the body—such as decreased pulmonary function. These changes are generally indicated by the occurrence of signs and symptoms in the exposed employees—such as shortness of breath, a non-measurable, subjective feeling. Employees exposed to such hazards must be apprised of both the change in body function and the signs and symptoms that may occur to signal that change.

The determination of occupational health hazards is complicated by the fact that many of the effects or signs and symptoms occur commonly in non-occupationally exposed populations, so that effects of exposure are difficult to separate from normally occurring illnesses. Occasionally, a substance causes an effect that is rarely seen in the population at large, such as angiosarcomas caused by vinyl chloride exposure, thus making it easier to ascertain that the occupational exposure was the primary causative factor. More often, however, the effects are common, such as lung cancer. The situation is further complicated by the fact that most chemicals have not been adequately tested to determine their health hazard potential, and data do not exist to substantiate these effects.

There have been many attempts to categorize effects and to define them in various ways. Generally, the terms ''acute'' and ''chronic'' are used to delineate between effects on the basis of severity or duration. ''Acute'' effects usually occur rapidly as a result of short-term exposures, and are of short duration. ''Chronic'' effects generally occur as a result of long-term exposure, and are of long duration.

The acute effects referred to most frequently are those defined by the American National Standards Institute (ANSI) standard for Precautionary Labeling of Hazardous Industrial Chemicals (Z129.1–1988)—irritation, corrosivity, sensitization and lethal dose. Although these are important health

effects, they do not adequately cover the considerable range of acute effects which may occur as a result of occupational exposure, such as, for example, narcosis.

Similarly, the term chronic effect is often used to cover only carcinogenicity, teratogenicity, and mutagenicity. These effects are obviously a concern in the workplace, but again, do not adequately cover the area of chronic effects, excluding, for example, blood dyscrasias (such as anemia), chronic bronchitis and liver atrophy.

The goal of defining precisely, in measurable terms, every possible health effect that may occur in the workplace as a result of chemical exposures cannot realistically be accomplished. This does not negate the need for employees to be informed of such effects and protected from them. Appendix B, which is also mandatory, outlines the principles and procedures of hazard assessment.

For purposes of this section, any chemicals which meet any of the following definitions, as determined by the criteria set forth in Appendix B are health hazards. However, this is not intended to be an exclusive categorization scheme. If there are available scientific data that involve other animal species or test methods, they must also be evaluated to determine the applicability of the HCS.7

1. *Carcinogen:* A chemical is considered to be a carcinogen if:

(a) It has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen; or

(b) It is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition); or,

(c) It is regulated by OSHA as a carcinogen.

2. *Corrosive:* A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact. For example, a chemical is considered to be corrosive if, when tested on the intact skin of albino rabbits by the method described by the U.S. Department of Transportation in appendix A to 49 CFR part 173, it destroys or changes irreversibly the structure of the tissue at the site of contact following an exposure period of four hours. This term shall not refer to action on inanimate surfaces.

3. *Highly toxic:* A chemical falling within any of the following categories:

(a) A chemical that has a median lethal dose (LD_{50}) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

(b) A chemical that has a median lethal dose (LD_{50}) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.

(c) A chemical that has a median lethal concentration (LC_{50}) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

4. *Irritant:* A chemical, which is not corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact. A chemical is a skin irritant if, when tested on the intact skin of albino rabbits by the methods of 16 CFR 1500.41 for four hours exposure or by other appropriate techniques, it results in an empirical score of five or more. A chemical is an eye irritant if so determined under the procedure listed in 16 CFR 1500.42 or other appropriate techniques.

5. *Sensitizer:* A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.

6. *Toxic.* A chemical falling within any of the following categories:

(a) A chemical that has a median lethal dose (LD_{50}) of more than 50 milligrams per kilogram but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

(b) A chemical that has a median lethal dose (LD_{50}) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.

(c) A chemical that has a median lethal concentration (LC_{50}) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than two milligrams per liter but not more than 20 milligrams per liter of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

7. *Target organ effects.*

The following is a target organ categorization of effects which may occur, including examples of signs and symptoms and chemicals which have been found to cause such effects. These examples are presented to illustrate the range and diversity of effects and hazards found in the workplace, and the broad scope employers must consider in this area, but are not intended to be all-inclusive.

a. Hepatotoxins: Chemicals which produce liver damage3

Signs & Symptoms: Jaundice; liver enlargement

Chemicals: Carbon tetrachloride; nitrosamines

b. Nephrotoxins: Chemicals which produce kidney damage
Signs & Symptoms: Edema; proteinuria
Chemicals: Halogenated hydrocarbons; uranium

c. Neurotoxins: Chemicals which produce their primary toxic effects on the nervous system
Signs & Symptoms: Narcosis; behavioral changes; decrease in motor functions
Chemicals: Mercury; carbon disulfide

d. Agents which act on the blood or hematopoietic system: Decrease hemoglobin function; deprive the body tissues of oxygen
Signs & Symptoms: Cyanosis; loss of consciousness
Chemicals: Carbon monoxide; cyanides

e. Agents which damage the lung: Chemicals which irritate or damage pulmonary tissue
Signs & Symptoms: Cough; tightness in chest; shortness of breath
Chemicals: Silica; asbestos

f. Reproductive toxins: Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis)
Signs & Symptoms: Birth defects; sterility
Chemicals: Lead; DBCP

g. Cutaneous hazards: Chemicals which affect the dermal layer of the body
Signs & Symptoms: Defatting of the skin; rashes; irritation
Chemicals: Ketones; chlorinated compounds

h. Eye hazards: Chemicals which affect the eye or visual capacity
Signs & Symptoms: Conjunctivitis; corneal damage
Chemicals: Organic solvents; acids

APPENDIX B TO § 1910.1200—HAZARD DETERMINATION (MANDATORY)

The quality of a hazard communication program is largely dependent upon the adequacy and accuracy of the hazard determination. The hazard determination requirement of this standard is performance-oriented. Chemical manufacturers, importers, and employers evaluating chemicals are not required to follow any specific methods for determining hazards, but they must be able to demonstrate that they have adequately ascertained the hazards of the chemicals produced or imported in accordance with the criteria set forth in this Appendix.

Hazard evaluation is a process which relies heavily on the professional judgment of the evaluator, particularly in the area of chronic hazards. The performance-orientation of the hazard determination does not diminish the duty of the chemical manufacturer, importer or employer to conduct a thorough evaluation, examining all relevant data and producing a scientifically defensible evaluation. For purposes of this standard, the following criteria shall be used in making hazard determinations that meet the requirements of this standard.

1. *Carcinogenicity:* As described in paragraph (d)(4) of this section and Appendix A of this section, a determination by the National Toxicology Program, the International Agency for Research on Cancer, or OSHA that a chemical is a carcinogen or potential carcinogen will be considered conclusive evidence for purposes of this section. In addition, however, all available scientific data on carcinogenicity must be evaluated in accordance with the provisions of this Appendix and the requirements of the rule.

2. *Human data:* Where available, epidemiological studies and case reports of adverse health effects shall be considered in the evaluation.

3. *Animal data:* Human evidence of health effects in exposed populations is generally not available for the majority of chemicals produced or used in the workplace. Therefore, the available results of toxicological testing in animal populations shall be used to predict the health effects that may be experienced by exposed workers. In particular, the definitions of certain acute hazards refer to specific animal testing results (see Appendix A).

4. *Adequacy and reporting of data.* The results of any studies which are designed and conducted according to established scientific principles, and which report statistically significant conclusions regarding the health effects of a chemical, shall be a sufficient basis for a hazard determination and reported on any material safety data sheet. *In vitro* studies alone generally do not form the basis for a definitive finding of hazard under the HCS since they have a positive or negative result rather than a statistically significant finding.

The chemical manufacturer, importer, or employer may also report the results of other scientifically valid studies which tend to refute the findings of hazard.

APPENDIX C TO § 1910.1200 [RESERVED]

APPENDIX D TO § 1910.1200—DEFINITION OF ''TRADE SECRET'' (MANDATORY)

The following is a reprint of the *Restatement of Torts* section 757, comment *b* (1939):

b. Definition of trade secret. A trade secret may consist of any formula, pattern, device or compilation of information which is used in one's business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it. It may be a formula for a chemical compound, a process of manufacturing, treating or preserving materials, a pattern for a machine or other device, or a list of customers. It differs from other secret information in a business (see

s759 of the *Restatement of Torts* which is not included in this Appendix) in that it is not simply information as to single or ephemeral events in the conduct of the business, as, for example, the amount or other terms of a secret bid for a contract or the salary of certain employees, or the security investments made or contemplated, or the date fixed for the announcement of a new policy or for bringing out a new model or the like. A trade secret is a process or device for continuous use in the operations of the business. Generally it relates to the production of goods, as, for example, a machine or formula for the production of an article. It may, however, relate to the sale of goods or to other operations in the business, such as a code for determining discounts, rebates or other concessions in a price list or catalogue, or a list of specialized customers, or a method of bookkeeping or other office management.

Secrecy. The subject matter of a trade secret must be secret. Matters of public knowledge or of general knowledge in an industry cannot be appropriated by one as his secret. Matters which are completely disclosed by the goods which one markets cannot be his secret. Substantially, a trade secret is known only in the particular business in which it is used. It is not requisite that only the proprietor of the business know it. He may, without losing his protection, communicate it to employees involved in its use. He may likewise communicate it to others pledged to secrecy. Others may also know of it independently, as, for example, when they have discovered the process or formula by independent invention and are keeping it secret. Nevertheless, a substantial element of secrecy must exist, so that, except by the use of improper means, there would be difficulty in acquiring the information. An exact definition of a trade secret is not possible. Some factors to be considered in determining whether given information is one's trade secret are: (1) The extent to which the information is known outside of his business; (2) the extent to which it is known by employees and others involved in his business; (3) the extent of measures taken by him to guard the secrecy of the information; (4) the value of the information to him and his competitors; (5) the amount of effort or money expended by him in developing the information; (6) the ease or difficulty with which the information could be properly acquired or duplicated by others.

Novelty and prior art. A trade secret may be a device or process which is patentable; but it need not be that. It may be a device or process which is clearly anticipated in the prior art or one which is merely a mechanical improvement that a good mechanic can make. Novelty and invention are not requisite for a trade secret as they are for patentability. These requirements are essential to patentability because a patent protects against unlicensed use of the patented device or process even by one who discovers it properly through independent research. The patent monopoly is a reward to the inventor. But such is not the case with a trade secret. Its protection is not based on a policy of rewarding or otherwise encouraging the development of secret processes or devices. The protection is merely against breach of faith and reprehensible means of learning another's secret. For this limited protection it is not appropriate to require also the kind of novelty and invention which is a requisite of patentability. The nature of the secret is, however, an important factor in determining the kind of relief that is appropriate against one who is subject to liability under the rule stated in this Section. Thus, if the secret consists of a device or process which is a novel invention, one who acquires the secret wrongfully is ordinarily enjoined from further use of it and is required to account for the profits derived from his past use. If, on the other hand, the secret consists of mechanical improvements that a good mechanic can make without resort to the secret, the wrongdoer's liability may be limited to damages, and an injunction against future use of the improvements made with the aid of the secret may be inappropriate.

APPENDIX E TO § 1910.1200—(ADVISORY)—GUIDELINES FOR EMPLOYER COMPLIANCE

The Hazard Communication Standard (HCS) is based on a simple concept—that employees have both a need and a right to know the hazards and identities of the chemicals they are exposed to when working. They also need to know what protective measures are available to prevent adverse effects from occurring. The HCS is designed to provide employees with the information they need.

Knowledge acquired under the HCS will help employers provide safer workplaces for their employees. When employers have information about the chemicals being used, they can take steps to reduce exposures, substitute less hazardous materials, and establish proper work practices. These efforts will help prevent the occurrence of work-related illnesses and injuries caused by chemicals.

The HCS addresses the issues of evaluating and communicating hazards to workers. Evaluation of chemical hazards involves a number of technical concepts, and is a process that requires the professional judgment of experienced experts. That's why the HCS is designed so that employers who simply use chemicals, rather than produce or import them, are not required to evaluate the hazards of those chemicals. Hazard determination is the responsibility of the producers and importers of the materials. Producers and importers of chemicals are then required to provide the hazard information to employers that purchase their products.

Employers that don't produce or import chemicals need only focus on those parts of the rule that deal with establishing a workplace program and communicating information to their workers. This appendix is a general guide for such employers to help them determine what's required under the rule. It does not supplant or substitute for the regulatory provisions, but rather provides a simplified outline of the steps an average employer would follow to meet those requirements.

1. Becoming Familiar With The Rule.

OSHA has provided a simple summary of the HCS in a pamphlet entitled ''Chemical Hazard Communication,'' OSHA Publication Number 3084. Some employers prefer to begin to become familiar with the rule's requirements by reading this pamphlet. A copy may be obtained from your local OSHA Area Office, or by contacting the OSHA Publications Office at (202) 523–9667.

The standard is long, and some parts of it are technical, but the basic concepts are simple. In fact, the requirements reflect what many employers have been doing for years. You may find that you are already largely in compliance with many of the provisions, and will simply have to modify your existing programs somewhat. If you are operating in an OSHA-approved State Plan State, you must comply with the State's requirements, which may be different than those of the Federal rule. Many of the State Plan States had hazard communication or ''right-to-know'' laws prior to promulgation of the Federal rule. Employers in State Plan States should contact their State OSHA offices for more information regarding applicable requirements.

The HCS requires information to be prepared and transmitted regarding all hazardous chemicals. The HCS covers both physical hazards (such as flammability), and health hazards (such as irritation, lung damage, and cancer). Most chemicals used in the workplace have some hazard potential, and thus will be covered by the rule.

One difference between this rule and many others adopted by OSHA is that this one is performance-oriented. That means that you have the flexibility to adapt the rule to the needs of your workplace, rather than having to follow specific, rigid requirements. It also means that you have to exercise more judgment to implement an appropriate and effective program.

The standard's design is simple. Chemical manufacturers and importers must evaluate the hazards of the chemicals they produce or import. Using that information, they must then prepare labels for containers, and more detailed technical bulletins called material safety data sheets (MSDS).

Chemical manufacturers, importers, and distributors of hazardous chemicals are all required to provide the appropriate labels and material safety data sheets to the employers to which they ship the chemicals. The information is to be provided automatically. Every container of hazardous chemicals you receive must be labeled, tagged, or marked with the required information. Your suppliers must also send you a properly completed material safety data sheet (MSDS) at the time of the first shipment of the chemical, and with the next shipment after the MSDS is updated with new and significant information about the hazards.

You can rely on the information received from your suppliers. You have no independent duty to analyze the chemical or evaluate the hazards of it.

Employers that ''use'' hazardous chemicals must have a program to ensure the information is provided to exposed employees. ''Use'' means to package, handle, react, or transfer. This is an intentionally broad scope, and includes any situation where a chemical is present in such a way that employees may be exposed under normal conditions of use or in a foreseeable emergency.

The requirements of the rule that deal specifically with the hazard communication program are found in this section in paragraphs (e), written hazard communication program; (f), labels and other forms of warning; (g), material safety data sheets; and (h), employee information and training. The requirements of these paragraphs should be the focus of your attention. Concentrate on becoming familiar with them, using paragraphs (b), scope and application, and (c), definitions, as references when needed to help explain the provisions.

There are two types of work operations where the coverage of the rule is limited. These are laboratories and operations where chemicals are only handled in sealed containers (*e.g.*, a warehouse). The limited provisions for these workplaces can be found in paragraph (b) of this section, scope and application. Basically, employers having these types of work operations need only keep labels on containers as they are received; maintain material safety data sheets that are received, and give employees access to them; and provide information and training for employees. Employers do not have to have written hazard communication programs and lists of chemicals for these types of operations.

The limited coverage of laboratories and sealed container operations addresses the obligation of an employer to the workers in the operations involved, and does not affect the employer's duties as a distributor of chemicals. For example, a distributor may have warehouse operations where employees would be protected under the limited sealed container provisions. In this situation, requirements for obtaining and maintaining MSDSs are limited to providing access to

those received with containers while the substance is in the workplace, and requesting MSDSs when employees request access for those not received with the containers. However, as a distributor of hazardous chemicals, that employer will still have responsibilities for providing MSDSs to downstream customers at the time of the first shipment and when the MSDS is updated. Therefore, although they may not be required for the employees in the work operation, the distributor may, nevertheless, have to have MSDSs to satisfy other requirements of the rule.

2. Identify Responsible Staff

Hazard communication is going to be a continuing program in your facility. Compliance with the HCS is not a ''one shot deal.'' In order to have a successful program, it will be necessary to assign responsibility for both the initial and ongoing activities that have to be undertaken to comply with the rule. In some cases, these activities may already be part of current job assignments. For example, site supervisors are frequently responsible for on-the-job training sessions. Early identification of the responsible employees, and involvement of them in the development of your plan of action, will result in a more effective program design. Evaluation of the effectiveness of your program will also be enhanced by involvement of affected employees.

For any safety and health program, success depends on commitment at every level of the organization. This is particularly true for hazard communication, where success requires a change in behavior. This will only occur if employers understand the program, and are committed to its success, and if employees are motivated by the people presenting the information to them.

3. Identify Hazardous Chemicals in the Workplace.

The standard requires a list of hazardous chemicals in the workplace as part of the written hazard communication program. The list will eventually serve as an inventory of everything for which an MSDS must be maintained. At this point, however, preparing the list will help you complete the rest of the program since it will give you some idea of the scope of the program required for compliance in your facility.

The best way to prepare a comprehensive list is to survey the workplace. Purchasing records may also help, and certainly employers should establish procedures to ensure that in the future purchasing procedures result in MSDSs being received before a material is used in the workplace.

The broadest possible perspective should be taken when doing the survey. Sometimes people think of ''chemicals'' as being only liquids in containers. The HCS covers chemicals in all physical forms—liquids, solids, gases, vapors, fumes, and mists—whether they are ''contained'' or not. The hazardous nature of the chemical and the potential for exposure are the factors which determine whether a chemical is covered. If it's not hazardous, it's not covered. If there is no potential for exposure (e.g., the chemical is inextricably bound and cannot be released), the rule does not cover the chemical.

Look around. Identify chemicals in containers, including pipes, but also think about chemicals generated in the work operations. For example, welding fumes, dusts, and exhaust fumes are all sources of chemical exposures. Read labels provided by suppliers for hazard information. Make a list of all chemicals in the workplace that are potentially hazardous. For your own information and planning, you may also want to note on the list the location(s) of the products within the workplace, and an indication of the hazards as found on the label. This will help you as you prepare the rest of your program.

Paragraph (b) of this section, scope and application, includes exemptions for various chemicals or workplace situations. After compiling the complete list of chemicals, you should review paragraph (b) of this section to determine if any of the items can be eliminated from the list because they are exempted materials. For example, food, drugs, and cosmetics brought into the workplace for employee consumption are exempt. So rubbing alcohol in the first aid kit would not be covered.

Once you have compiled as complete a list as possible of the potentially hazardous chemicals in the workplace, the next step is to determine if you have received material safety data sheets for all of them. Check your files against the inventory you have just compiled. If any are missing, contact your supplier and request one. It is a good idea to document these requests, either by copy of a letter or a note regarding telephone conversations. If you have MSDSs for chemicals that are not on your list, figure out why. Maybe you don't use the chemical anymore. Or maybe you missed it in your survey. Some suppliers do provide MSDSs for products that are not hazardous. These do not have to be maintained by you.

You should not allow employees to use any chemicals for which you have not received an MSDS. The MSDS provides information you need to ensure proper protective measures are implemented prior to exposure.

4. Preparing and Implementing a Hazard Communication Program

All workplaces where employees are exposed to hazardous chemicals must have a written plan which describes how the standard will be implemented in that facility.

Preparation of a plan is not just a paper exercise—all of the elements must be implemented in the workplace in order to be in compliance with the rule. See paragraph (e) of this section for the specific requirements regarding written hazard communication programs. The only work operations which do not have to comply with the written plan requirements are laboratories and work operations where employees only handle chemicals in sealed containers. See paragraph (b) of this section, scope and application, for the specific requirements for these two types of workplaces.

The plan does not have to be lengthy or complicated. It is intended to be a blueprint for implementation of your program—an assurance that all aspects of the requirements have been addressed.

Many trade associations and other professional groups have provided sample programs and other assistance materials to affected employers. These have been very helpful to many employers since they tend to be tailored to the particular industry involved. You may wish to investigate whether your industry trade groups have developed such materials.

Although such general guidance may be helpful, you must remember that the written program has to reflect what you are doing in your workplace. Therefore, if you use a generic program it must be adapted to address the facility it covers. For example, the written plan must list the chemicals present at the site, indicate who is to be responsible for the various aspects of the program in your facility, and indicate where written materials will be made available to employees.

If OSHA inspects your workplace for compliance with the HCS, the OSHA compliance officer will ask to see your written plan at the outset of the inspection. In general, the following items will be considered in evaluating your program.

The written program must describe how the requirements for labels and other forms of warning, material safety data sheets, and employee information and training, are going to be met in your facility. The following discussion provides the type of information compliance officers will be looking for to decide whether these elements of the hazard communication program have been properly addressed:

A. Labels and Other Forms of Warning

In-plant containers of hazardous chemicals must be labeled, tagged, or marked with the identity of the material and appropriate hazard warnings. Chemical manufacturers, importers, and distributors are required to ensure that every container of hazardous chemicals they ship is appropriately labeled with such information and with the name and address of the producer or other responsible party. Employers purchasing chemicals can rely on the labels provided by their suppliers. If the material is subsequently transferred by the employer from a labeled container to another container, the employer will have to label that container unless it is subject to the portable container exemption. See paragraph (f) of this section for specific labeling requirements.

The primary information to be obtained from an OSHA-required label is an identity for the material, and appropriate hazard warnings. The identity is any term which appears on the label, the MSDS, and the list of chemicals, and thus links these three sources of information. The identity used by the supplier may be a common or trade name (''Black Magic Formula''), or a chemical name (1,1,1,-trichloroethane). The hazard warning is a brief statement of the hazardous effects of the chemical (''flammable,'' ''causes lung damage''). Labels frequently contain other information, such as precautionary measures (''do not use near open flame''), but this information is provided voluntarily and is not required by the rule. Labels must be legible, and prominently displayed. There are no specific requirements for size or color, or any specified text.

With these requirements in mind, the compliance officer will be looking for the following types of information to ensure that labeling will be properly implemented in your facility:

1. Designation of person(s) responsible for ensuring labeling of in-plant containers;

2. Designation of person(s) responsible for ensuring labeling of any shipped containers;

3. Description of labeling system(s) used;

4. Description of written alternatives to labeling of in-plant containers (if used); and,

5. Procedures to review and update label information when necessary.

Employers that are purchasing and using hazardous chemicals—rather than producing or distributing them—will primarily be concerned with ensuring that every purchased container is labeled. If materials are transferred into other containers, the employer must ensure that these are labeled as well, unless they fall under the portable container exemption (paragraph (f)(7) of this section). In terms of labeling systems, you can simply choose to use the labels provided by your suppliers on the containers. These will generally be verbal text labels, and do not usually include numerical rating systems or symbols that require special training. The most important thing to remember is that this is a continuing duty—all in-plant containers of hazardous chemicals must always be labeled. Therefore, it is important to designate someone to be responsible for ensuring that the labels are maintained as required on the containers in your facility, and that newly purchased materials are checked for labels prior to use.

B. Material Safety Data Sheets

Chemical manufacturers and importers are required to obtain or develop a material safety data sheet for each hazardous chemical they produce or import. Distributors are responsible for ensuring that their customers are provided a copy of these MSDSs. Employers must have an MSDS for each hazardous chemical which they use. Employers may rely on the information received from their suppliers. The specific requirements for material safety data sheets are in paragraph (g) of this section.

There is no specified format for the MSDS under the rule, although there are specific information requirements. OSHA has developed a non-mandatory format, OSHA Form 174, which may be used by chemical manufacturers and importers to comply with the rule. The MSDS must be in English. You are entitled to receive from your supplier a data sheet which includes all of the information required under the rule. If you do not receive one automatically, you should request one. If you receive one that is obviously inadequate, with, for example, blank spaces that are not completed, you should request an appropriately completed one. If your request for a data sheet or for a corrected data sheet does not produce the information needed, you should contact your local OSHA Area Office for assistance in obtaining the MSDS.

The role of MSDSs under the rule is to provide detailed information on each hazardous chemical, including its potential hazardous effects, its physical and chemical characteristics, and recommendations for appropriate protective measures. This information should be useful to you as the employer responsible for designing protective programs, as well as to the workers. If you are not familiar with material safety data sheets and with chemical terminology, you may need to learn to use them yourself. A glossary of MSDS terms may be helpful in this regard. Generally speaking, most employers using hazardous chemicals will primarily be concerned with MSDS information regarding hazardous effects and recommended protective measures. Focus on the sections of the MSDS that are applicable to your situation.

MSDSs must be readily accessible to employees when they are in their work areas during their workshifts. This may be accomplished in many different ways. You must decide what is appropriate for your particular workplace. Some employers keep the MSDSs in a binder in a central location (*e.g.*, in the pick-up truck on a construction site). Others, particularly in workplaces with large numbers of chemicals, computerize the information and provide access through terminals. As long as employees can get the information when they need it, any approach may be used. The employees must have access to the MSDSs themselves—simply having a system where the information can be read to them over the phone is only permitted under the mobile worksite provision, paragraph (g)(9) of this section, when employees must travel between workplaces during the shift. In this situation, they have access to the MSDSs prior to leaving the primary worksite, and when they return, so the telephone system is simply an emergency arrangement.

In order to ensure that you have a current MSDS for each chemical in the plant as required, and that employee access is provided, the compliance officers will be looking for the following types of information in your written program:

1. Designation of person(s) responsible for obtaining and maintaining the MSDSs;

2. How such sheets are to be maintained in the workplace (*e.g.*, in notebooks in the work area(s) or in a computer with terminal access), and how employees can obtain access to them when they are in their work area during the work shift;

3. Procedures to follow when the MSDS is not received at the time of the first shipment;

4. For producers, procedures to update the MSDS when new and significant health information is found; and,

5. Description of alternatives to actual data sheets in the workplace, if used.

For employers using hazardous chemicals, the most important aspect of the written program in terms of MSDSs is to ensure that someone is responsible for obtaining and maintaining the MSDSs for every hazardous chemical in the workplace. The list of hazardous chemicals required to be maintained as part of the written program will serve as an inventory. As new chemicals are purchased, the list should be updated. Many companies have found it convenient to include on their purchase orders the name and address of the person designated in their company to receive MSDSs.

C. Employee Information and Training

Each employee who may be ''exposed'' to hazardous chemicals when working must be provided information and trained prior to initial assignment to work with a hazardous chemical, and whenever the hazard changes. ''Exposure'' or ''exposed'' under the rule means that ''an employee is subjected to a hazardous chemical in the course of employment through any route of entry (inhalation, ingestion, skin contact or absorption, etc.) and includes potential (*e.g.*, accidental or possible) exposure.'' See paragraph (h) of this section for specific requirements. Information and training may be done either by individual chemical, or by categories of hazards (such as flammability or carcinogenicity). If there are only a few chemicals in the workplace, then you may want to discuss each one individually. Where there are large numbers of chemicals, or the chemicals change

frequently, you will probably want to train generally based on the hazard categories (*e.g.*, flammable liquids, corrosive materials, carcinogens). Employees will have access to the substance-specific information on the labels and MSDSs.

Information and training is a critical part of the hazard communication program. Information regarding hazards and protective measures are provided to workers through written labels and material safety data sheets. However, through effective information and training, workers will learn to read and understand such information, determine how it can be obtained and used in their own workplaces, and understand the risks of exposure to the chemicals in their workplaces as well as the ways to protect themselves. A properly conducted training program will ensure comprehension and understanding. It is not sufficient to either just read material to the workers, or simply hand them material to read. You want to create a climate where workers feel free to ask questions. This will help you to ensure that the information is understood. You must always remember that the underlying purpose of the HCS is to reduce the incidence of chemical source illnesses and injuries. This will be accomplished by modifying behavior through the provision of hazard information and information about protective measures. If your program works, you and your workers will better understand the chemical hazards within the workplace. The procedures you establish regarding, for example, purchasing, storage, and handling of these chemicals will improve, and thereby reduce the risks posed to employees exposed to the chemical hazards involved. Furthermore, your workers' comprehension will also be increased, and proper work practices will be followed in your workplace.

If you are going to do the training yourself, you will have to understand the material and be prepared to motivate the workers to learn. This is not always an easy task, but the benefits are worth the effort. More information regarding appropriate training can be found in OSHA Publication No. 2254 which contains voluntary training guidelines prepared by OSHA's Training Institute. A copy of this document is available from OSHA's Publications Office at (202) 219–4667.

In reviewing your written program with regard to information and training, the following items need to be considered:

1. Designation of person(s) responsible for conducting training;

2. Format of the program to be used (audiovisuals, classroom instruction, etc.);

3. Elements of the training program (should be consistent with the elements in paragraph (h) of this section); and,

4. Procedure to train new employees at the time of their initial assignment to work with a hazardous chemical, and to train employees when a new hazard is introduced into the workplace.

The written program should provide enough details about the employer's plans in this area to assess whether or not a good faith effort is being made to train employees. OSHA does not expect that every worker will be able to recite all of the information about each chemical in the workplace. In general, the most important aspects of training under the HCS are to ensure that employees are aware that they are exposed to hazardous chemicals, that they know how to read and use labels and material safety data sheets, and that, as a consequence of learning this information, they are following the appropriate protective measures established by the employer. OSHA compliance officers will be talking to employees to determine if they have received training, if they know they are exposed to hazardous chemicals, and if they know where to obtain substance-specific information on labels and MSDSs.

The rule does not require employers to maintain records of employee training, but many employers choose to do so. This may help you monitor your own program to ensure that all employees are appropriately trained. If you already have a training program, you may simply have to supplement it with whatever additional information is required under the HCS. For example, construction employers that are already in compliance with the construction training standard (29 CFR 1926.21) will have little extra training to do.

An employer can provide employees information and training through whatever means are found appropriate and protective. Although there would always have to be some training on-site (such as informing employees of the location and availability of the written program and MSDSs), employee training may be satisfied in part by general training about the requirements of the HCS and about chemical hazards on the job which is provided by, for example, trade associations, unions, colleges, and professional schools. In addition, previous training, education and experience of a worker may relieve the employer of some of the burdens of informing and training that worker. Regardless of the method relied upon, however, the employer is always ultimately responsible for ensuring that employees are adequately trained. If the compliance officer finds that the training is deficient, the employer will be cited for the deficiency regardless of who actually provided the training on behalf of the employer.

D. Other Requirements

In addition to these specific items, compliance officers will also be asking the following questions in assessing the adequacy of the program:

Does a list of the hazardous chemicals exist in each work area or at a central location?

Are methods the employer will use to inform employees of the hazards of non-routine tasks outlined?

Are employees informed of the hazards associated with chemicals contained in unlabeled pipes in their work areas?

On multi-employer worksites, has the employer provided other employers with information about labeling systems and precautionary measures where the other employers have employees exposed to the initial employer's chemicals?

Is the written program made available to employees and their designated representatives?

If your program adequately addresses the means of communicating information to employees in your workplace, and provides answers to the basic questions outlined above, it will be found to be in compliance with the rule.

5. Checklist for Compliance

The following checklist will help to ensure you are in compliance with the rule:

Obtained a copy of the rule. _____

Read and understood the requirements. _____

Assigned responsibility for tasks. _____

Prepared an inventory of chemicals. _____

Ensured containers are labeled. _____

Obtained MSDS for each chemical. _____

Prepared written program. _____

Made MSDSs available to workers. _____

Conducted training of workers. _____

Established procedures to maintain current program. _____

Established procedures to evaluate effectiveness. _____

6. Further Assistance

If you have a question regarding compliance with the HCS, you should contact your local OSHA Area Office for assistance. In addition, each OSHA Regional Office has a Hazard Communication Coordinator who can answer your questions. Free consultation services are also available to assist employers, and information regarding these services can be obtained through the Area and Regional offices as well.

The telephone number for the OSHA office closest to you should be listed in your local telephone directory. If you are not able to obtain this information, you may contact OSHA's Office of Information and Consumer Affairs at (202) 219–8151 for further assistance in identifying the appropriate contacts.

[59 FR 6170, Feb. 9, 1994, as amended at 59 FR 17479, Apr. 13, 1994; 59 FR 65948, Dec. 22, 1994; 61 FR 9245, Mar. 7. 1996]

§ 1910.1201 Retention of DOT markings, placards and labels.

(a) Any employer who receives a package of hazardous material which is required to be marked, labeled or placarded in accordance with the U. S. Department of Transportation's Hazardous Materials Regulations (49 CFR Parts 171 through 180) shall retain those markings, labels and placards on the package until the packaging is sufficiently cleaned of residue and purged of vapors to remove any potential hazards.

(b) Any employer who receives a freight container, rail freight car, motor vehicle, or transport vehicle that is required to be marked or placarded in accordance with the Hazardous Materials Regulations shall retain those markings and placards on the freight container, rail freight car, motor vehicle or transport vehicle until the hazardous materials which require the marking or placarding are sufficiently removed to prevent any potential hazards.

(c) Markings, placards and labels shall be maintained in a manner that ensures that they are readily visible.

(d) For non-bulk packages which will not be reshipped, the provisions of this section are met if a label or other acceptable marking is affixed in accordance with the Hazard Communication Standard (29 CFR 1910.1200).

(e) For the purposes of this section, the term ''hazardous material'' and any other terms not defined in this section have the same definition as in the Hazardous Materials Regulations (49 CFR Parts 171 through 180).

[59 FR 36700, July 19, 1994]

§ 1910.1450 Occupational exposure to hazardous chemicals in laboratories.

(a) *Scope and application.* (1) This section shall apply to all employers engaged in the laboratory use of hazardous chemicals as defined below.

(2) Where this section applies, it shall supersede, for laboratories, the requirements of all other OSHA health standards in 29 CFR part 1910, subpart Z, except as follows:

Filter Lenses for Protection Against Radiant Energy

Operations	Plate thickness—inches	Plate thickness—mm	Minimum* Protective Shade
Gas Welding:			
Light	Under 1/8	Under 3.2	4
Medium	1/8 to 1/2	3.2 to 12.7	5
Heavy	Over 1/2	Over 12.7	6
Oxygen cutting:			
Light	Under 1	Under 25	3
Medium	1 to 6	25 to 150	4
Heavy	Over 6	Over 150	5

* As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.

** These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.

(b) *Criteria for protective eye and face protection.* (1) Protective eye and face protection devices must comply with any of the following consensus standards:

(i) ANSI Z87.1–2003, ''American National Standard Practice for Occupational and Educational Eye and Face Protection,'' which is incorporated by reference in §1910.6;

(ii) ANSI Z87.1–1989 (R–1998), ''American National Standard Practice for Occupational and Educational Eye and Face Protection,'' which is incorporated by reference in §1910.6; or

(iii) ANSI Z87.1–1989, ''American National Standard Practice for Occupational and Educational Eye and Face Protection,'' which is incorporated by reference in §1910.6.

(2) Protective eye and face protection devices that the employer demonstrates are at least as effective as protective eye and face protection devices that are constructed in accordance with one of the above consensus standards will be deemed to be in compliance with the requirements of this section.

[59 FR 16360, Apr. 6, 1994; 59 FR 33911, July 1, 1994, as amended at 61 FR 9238, Mar. 7, 1996; 61 FR 19548, May 2, 1996; 74 FR 46356, Sept. 9, 2009]

§1910.134 Respiratory protection.

This section applies to General Industry (part 1910), Shipyards (part 1915), Marine Terminals (part 1917), Longshoring (part 1918), and Construction (part 1926).

(a) *Permissible practice.* (1) In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to this section.

(2) A respirator shall be provided to each employee when such equipment is necessary to protect the health of such employee. The employer shall provide the respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protection program, which shall include the requirements outlined in paragraph (c) of this section. The program shall cover each employee required by this section to use a respirator.

(b) *Definitions.* The following definitions are important terms used in the

Chapter 17: North Carolina Asbestos Information

respiratory protection standard in this section.

Air-purifying respirator means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

Assigned protection factor (APF) means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified by this section.

Atmosphere-supplying respirator means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or cartridge means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Demand respirator means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

Emergency situation means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

Employee exposure means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

End-of-service-life indicator (ESLI) means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-only respirator means a respirator intended to be used only for emergency exit.

Filter or air purifying element means a component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering facepiece (dust mask) means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Fit factor means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit test means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

Helmet means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

High efficiency particulate air (HEPA) filter means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH) means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Interior structural firefighting means the physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage. (See 29 CFR 1910.155)

Loose-fitting facepiece means a respiratory inlet covering that is designed to form a partial seal with the face.

Maximum use concentration (MUC) means the maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance. The MUC can be determined

mathematically by multiplying the assigned protection factor specified for a respirator by the required OSHA permissible exposure limit, short-term exposure limit, or ceiling limit. When no OSHA exposure limit is available for a hazardous substance, an employer must determine an MUC on the basis of relevant available information and informed professional judgment.

Negative pressure respirator (tight fitting) means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Oxygen deficient atmosphere means an atmosphere with an oxygen content below 19.5% by volume.

Physician or other licensed health care professional (PLHCP) means an individual whose legally permitted scope of practice (*i.e.,* license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e) of this section.

Positive pressure respirator means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator means a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

Qualitative fit test (QLFT) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Respiratory inlet covering means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Self-contained breathing apparatus (SCBA) means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Service life means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Supplied-air respirator (SAR) or airline respirator means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

This section means this respiratory protection standard.

Tight-fitting facepiece means a respiratory inlet covering that forms a complete seal with the face.

User seal check means an action conducted by the respirator user to determine if the respirator is properly seated to the face.

(c) *Respiratory protection program.* This paragraph requires the employer to develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. The program must be administered by a suitably trained program administrator. In addition, certain program elements may be required for voluntary use to prevent potential hazards associated with the use of the respirator. The Small Entity Compliance Guide contains criteria for the selection of a program administrator and a sample program that meets the requirements of this paragraph. Copies of the Small Entity Compliance Guide will be available on or about April 8, 1998 from the Occupational Safety and Health Administration's Office of Publications, Room N 3101, 200 Constitution Avenue, NW, Washington, DC, 20210 (202–219–4667).

(1) In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. The program shall be updated as necessary to reflect those changes in workplace conditions that

affect respirator use. The employer shall include in the program the following provisions of this section, as applicable:

(i) Procedures for selecting respirators for use in the workplace;

(ii) Medical evaluations of employees required to use respirators;

(iii) Fit testing procedures for tight-fitting respirators;

(iv) Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;

(v) Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;

(vi) Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;

(vii) Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;

(viii) Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and

(ix) Procedures for regularly evaluating the effectiveness of the program.

(2) Where respirator use is not required:

(i) An employer may provide respirators at the request of employees or permit employees to use their own respirators, if the employer determines that such respirator use will not in itself create a hazard. If the employer determines that any voluntary respirator use is permissible, the employer shall provide the respirator users with the information contained in appendix D to this section (''Information for Employees Using Respirators When Not Required Under the Standard''); and

(ii) In addition, the employer must establish and implement those elements of a written respiratory protection program necessary to ensure that any employee using a respirator voluntarily is medically able to use that respirator, and that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user. Exception: Employers are not required to include in a written respiratory protection program those employees whose only use of respirators involves the voluntary use of filtering facepieces (dust masks).

(3) The employer shall designate a program administrator who is qualified by appropriate training or experience that is commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

(4) The employer shall provide respirators, training, and medical evaluations at no cost to the employee.

(d) *Selection of respirators.* This paragraph requires the employer to evaluate respiratory hazard(s) in the workplace, identify relevant workplace and user factors, and base respirator selection on these factors. The paragraph also specifies appropriately protective respirators for use in IDLH atmospheres, and limits the selection and use of air-purifying respirators.

(1) *General requirements.* (i) The employer shall select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.

(ii) The employer shall select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.

(iii) The employer shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer cannot identify or reasonably estimate the employee exposure, the employer shall consider the atmosphere to be IDLH.

(iv) The employer shall select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

(2) *Respirators for IDLH atmospheres.* (i) The employer shall provide the following respirators for employee use in IDLH atmospheres:

(A) A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or

(B) A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

(ii) Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

(iii) All oxygen-deficient atmospheres shall be considered IDLH. Exception: If the employer demonstrates that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II of this section (i.e., for the altitudes set out in the table), then any atmosphere-supplying respirator may be used.

(3) *Respirators for atmospheres that are not IDLH.* (i) The employer shall provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations.

(A) *Assigned Protection Factors (APFs).* Employers must use the assigned protection factors listed in Table 1 to select a respirator that meets or exceeds the required level of employee protection. When using a combination respirator (e.g., airline respirators with an air-purifying filter), employers must ensure that the assigned protection factor is appropriate to the mode of operation in which the respirator is being used.

TABLE 1—ASSIGNED PROTECTION FACTORS [5]

Type of respirator [1] [2]	Quarter mask	Half mask	Full facepiece	Helmet/hood	Loose-fitting facepiece
1. Air-Purifying Respirator	5	[3] 10	50	.....	.....
2. Powered Air-Purifying Respirator (PAPR)	.....	50	1,000	[4] 25/1,000	25
3. Supplied-Air Respirator (SAR) or Airline Respirator.					
• Demand mode	.....	10	50	.....	.....
• Continuous flow mode	.....	50	1,000	[4] 25/1,000	25
• Pressure-demand or other positive-pressure mode	.....	50	1,000	.....	.....
4. Self-Contained Breathing Apparatus (SCBA).					
• Demand mode	.....	10	50	50	.....
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	.....	.....	10,000	10,000	.....

Notes:

[1] Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

[2] The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

[3] This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

[4] The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

[5] These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

(B) *Maximum Use Concentration (MUC).* (*1*) The employer must select a respirator for employee use that maintains the employee's exposure to the hazardous substance, when measured outside the respirator, at or below the MUC.

(*2*) Employers must not apply MUCs to conditions that are immediately dangerous to life or health (IDLH); instead, they must use respirators listed for IDLH conditions in paragraph (d)(2) of this standard.

(*3*) When the calculated MUC exceeds the IDLH level for a hazardous substance, or the performance limits of the cartridge or canister, then employers must set the maximum MUC at that lower limit.

(ii) The respirator selected shall be appropriate for the chemical state and physical form of the contaminant.

(iii) For protection against gases and vapors, the employer shall provide:

(A) An atmosphere-supplying respirator, or

(B) An air-purifying respirator, provided that:

(*1*) The respirator is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or

(*2*) If there is no ESLI appropriate for conditions in the employer's workplace, the employer implements a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. The employer shall describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data.

(iv) For protection against particulates, the employer shall provide:

(A) An atmosphere-supplying respirator; or

(B) An air-purifying respirator equipped with a filter certified by NIOSH under 30 CFR part 11 as a high efficiency particulate air (HEPA) filter, or an air-purifying respirator equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or

(C) For contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers, an air-purifying respirator equipped with any filter certified for particulates by NIOSH.

TABLE I—ASSIGNED PROTECTION FACTORS [RESERVED]

TABLE II

Altitude (ft.)	Oxygen deficient Atmospheres (% 0_2) for which the employer may rely on atmosphere-supplying respirators
Less than 3,001	16.0–19.5
3,001–4,000	16.4–19.5
4,001–5,000	17.1–19.5
5,001–6,000	17.8–19.5
6,001–7,000	18.5–19.5
7,001–8,000 [1]	19.3–19.5.

[1] Above 8,000 feet the exception does not apply. Oxygen-enriched breathing air must be supplied above 14,000 feet.

(e) *Medical evaluation.* Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. Accordingly, this paragraph specifies the minimum requirements for medical evaluation that employers must implement to determine the employee's ability to use a respirator.

(1) *General.* The employer shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. The employer may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

(2) *Medical evaluation procedures.* (i) The employer shall identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire.

(ii) The medical evaluation shall obtain the information requested by the questionnaire in Sections 1 and 2, part A of appendix C of this section.

(3) *Follow-up medical examination.* (i) The employer shall ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, part A of appendix C or whose initial medical examination demonstrates the need for a follow-up medical examination.

(ii) The follow-up medical examination shall include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

(4) *Administration of the medical questionnaire and examinations.* (i) The medical questionnaire and examinations shall be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire shall be administered in a manner that ensures that the employee understands its content.

(ii) The employer shall provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.

(5) *Supplemental information for the PLHCP.* (i) The following information must be provided to the PLHCP before the PLHCP makes a recommendation

concerning an employee's ability to use a respirator:

(A) The type and weight of the respirator to be used by the employee;

(B) The duration and frequency of respirator use (including use for rescue and escape);

(C) The expected physical work effort;

(D) Additional protective clothing and equipment to be worn; and

(E) Temperature and humidity extremes that may be encountered.

(ii) Any supplemental information provided previously to the PLHCP regarding an employee need not be provided for a subsequent medical evaluation if the information and the PLHCP remain the same.

(iii) The employer shall provide the PLHCP with a copy of the written respiratory protection program and a copy of this section.

NOTE TO PARAGRAPH (e)(5)(iii): When the employer replaces a PLHCP, the employer must ensure that the new PLHCP obtains this information, either by providing the documents directly to the PLHCP or having the documents transferred from the former PLHCP to the new PLHCP. However, OSHA does not expect employers to have employees medically reevaluated solely because a new PLHCP has been selected.

(6) *Medical determination.* In determining the employee's ability to use a respirator, the employer shall:

(i) Obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation shall provide only the following information:

(A) Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;

(B) The need, if any, for follow-up medical evaluations; and

(C) A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

(ii) If the respirator is a negative pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, the employer shall provide a PAPR if the PLHCP's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then the employer is no longer required to provide a PAPR.

(7) *Additional medical evaluations.* At a minimum, the employer shall provide additional medical evaluations that comply with the requirements of this section if:

(i) An employee reports medical signs or symptoms that are related to ability to use a respirator;

(ii) A PLHCP, supervisor, or the respirator program administrator informs the employer that an employee needs to be reevaluated;

(iii) Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation; or

(iv) A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

(f) *Fit testing.* This paragraph requires that, before an employee may be required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. This paragraph specifies the kinds of fit tests allowed, the procedures for conducting them, and how the results of the fit tests must be used.

(1) The employer shall ensure that employees using a tight-fitting facepiece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) as stated in this paragraph.

(2) The employer shall ensure that an employee using a tight-fitting facepiece respirator is fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually thereafter.

(3) The employer shall conduct an additional fit test whenever the employee reports, or the employer, PLHCP, supervisor, or program administrator

makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

(4) If after passing a QLFT or QNFT, the employee subsequently notifies the employer, program administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable opportunity to select a different respirator facepiece and to be retested.

(5) The fit test shall be administered using an OSHA-accepted QLFT or QNFT protocol. The OSHA-accepted QLFT and QNFT protocols and procedures are contained in appendix A of this section.

(6) QLFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less.

(7) If the fit factor, as determined through an OSHA-accepted QNFT protocol, is equal to or greater than 100 for tight-fitting half facepieces, or equal to or greater than 500 for tight-fitting full facepieces, the QNFT has been passed with that respirator.

(8) Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

(i) Qualitative fit testing of these respirators shall be accomplished by temporarily converting the respirator user's actual facepiece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator facepiece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator facepiece.

(ii) Quantitative fit testing of these respirators shall be accomplished by modifying the facepiece to allow sampling inside the facepiece in the breathing zone of the user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate facepiece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the facepiece.

(iii) Any modifications to the respirator facepiece for fit testing shall be completely removed, and the facepiece restored to NIOSH-approved configuration, before that facepiece can be used in the workplace.

(g) *Use of respirators.* This paragraph requires employers to establish and implement procedures for the proper use of respirators. These requirements include prohibiting conditions that may result in facepiece seal leakage, preventing employees from removing respirators in hazardous environments, taking actions to ensure continued effective respirator operation throughout the work shift, and establishing procedures for the use of respirators in IDLH atmospheres or in interior structural firefighting situations.

(1) *Facepiece seal protection.* (i) The employer shall not permit respirators with tight-fitting facepieces to be worn by employees who have:

(A) Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or

(B) Any condition that interferes with the face-to-facepiece seal or valve function.

(ii) If an employee wears corrective glasses or goggles or other personal protective equipment, the employer shall ensure that such equipment is worn in a manner that does not interfere with the seal of the facepiece to the face of the user.

(iii) For all tight-fitting respirators, the employer shall ensure that employees perform a user seal check each time they put on the respirator using the procedures in appendix B–1 or procedures recommended by the respirator manufacturer that the employer demonstrates are as effective as those in appendix B–1 of this section.

(2) *Continuing respirator effectiveness.* (i) Appropriate surveillance shall be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee

exposure or stress that may affect respirator effectiveness, the employer shall reevaluate the continued effectiveness of the respirator.

(ii) The employer shall ensure that employees leave the respirator use area:

(A) To wash their faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respirator use; or

(B) If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece; or

(C) To replace the respirator or the filter, cartridge, or canister elements.

(iii) If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece, the employer must replace or repair the respirator before allowing the employee to return to the work area.

(3) *Procedures for IDLH atmospheres.* For all IDLH atmospheres, the employer shall ensure that:

(i) One employee or, when needed, more than one employee is located outside the IDLH atmosphere;

(ii) Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;

(iii) The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;

(iv) The employer or designee is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;

(v) The employer or designee authorized to do so by the employer, once notified, provides necessary assistance appropriate to the situation;

(vi) Employee(s) located outside the IDLH atmospheres are equipped with:

(A) Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either

(B) Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or

(C) Equivalent means for rescue where retrieval equipment is not required under paragraph (g)(3)(vi)(B).

(4) *Procedures for interior structural firefighting.* In addition to the requirements set forth under paragraph (g)(3), in interior structural fires, the employer shall ensure that:

(i) At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;

(ii) At least two employees are located outside the IDLH atmosphere; and

(iii) All employees engaged in interior structural firefighting use SCBAs.

NOTE 1 TO PARAGRAPH (g): One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.

NOTE 2 TO PARAGRAPH (g): Nothing in this section is meant to preclude firefighters from performing emergency rescue activities before an entire team has assembled.

(h) *Maintenance and care of respirators.* This paragraph requires the employer to provide for the cleaning and disinfecting, storage, inspection, and repair of respirators used by employees.

(1) *Cleaning and disinfecting.* The employer shall provide each respirator user with a respirator that is clean, sanitary, and in good working order. The employer shall ensure that respirators are cleaned and disinfected using the procedures in appendix B–2 of this section, or procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness. The respirators shall be cleaned and disinfected at the following intervals:

(i) Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition;

(ii) Respirators issued to more than one employee shall be cleaned and disinfected before being worn by different individuals;

(iii) Respirators maintained for emergency use shall be cleaned and disinfected after each use; and

(iv) Respirators used in fit testing and training shall be cleaned and disinfected after each use.

(2) *Storage.* The employer shall ensure that respirators are stored as follows:

(i) All respirators shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they shall be packed or stored to prevent deformation of the facepiece and exhalation valve.

(ii) In addition to the requirements of paragraph (h)(2)(i) of this section, emergency respirators shall be:

(A) Kept accessible to the work area;

(B) Stored in compartments or in covers that are clearly marked as containing emergency respirators; and

(C) Stored in accordance with any applicable manufacturer instructions.

(3) *Inspection.* (i) The employer shall ensure that respirators are inspected as follows:

(A) All respirators used in routine situations shall be inspected before each use and during cleaning;

(B) All respirators maintained for use in emergency situations shall be inspected at least monthly and in accordance with the manufacturer's recommendations, and shall be checked for proper function before and after each use; and

(C) Emergency escape-only respirators shall be inspected before being carried into the workplace for use.

(ii) The employer shall ensure that respirator inspections include the following:

(A) A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges, canisters or filters; and

(B) A check of elastomeric parts for pliability and signs of deterioration.

(iii) In addition to the requirements of paragraphs (h)(3)(i) and (ii) of this section, self-contained breathing apparatus shall be inspected monthly. Air and oxygen cylinders shall be maintained in a fully charged state and shall be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. The employer shall determine that the regulator and warning devices function properly.

(iv) For respirators maintained for emergency use, the employer shall:

(A) Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator; and

(B) Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information shall be maintained until replaced following a subsequent certification.

(4) *Repairs.* The employer shall ensure that respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:

(i) Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and shall use only the respirator manufacturer's NIOSH-approved parts designed for the respirator;

(ii) Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed; and

(iii) Reducing and admission valves, regulators, and alarms shall be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

(i) *Breathing air quality and use.* This paragraph requires the employer to provide employees using atmosphere-supplying respirators (supplied-air and SCBA) with breathing gases of high purity.

(1) The employer shall ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration accords with the following specifications:

(i) Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and

(ii) Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G–7.1–1989, to include:

(A) Oxygen content (v/v) of 19.5–23.5%;

(B) Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;

(C) Carbon monoxide (CO) content of 10 ppm or less;

(D) Carbon dioxide content of 1,000 ppm or less; and

(E) Lack of noticeable odor.

(2) The employer shall ensure that compressed oxygen is not used in atmosphere-supplying respirators that have previously used compressed air.

(3) The employer shall ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.

(4) The employer shall ensure that cylinders used to supply breathing air to respirators meet the following requirements:

(i) Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 180);

(ii) Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and

(iii) The moisture content in the cylinder does not exceed a dew point of −50 °F (−45.6 °C) at 1 atmosphere pressure.

(5) The employer shall ensure that compressors used to supply breathing air to respirators are constructed and situated so as to:

(i) Prevent entry of contaminated air into the air-supply system;

(ii) Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 °C) below the ambient temperature;

(iii) Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.

(iv) Have a tag containing the most recent change date and the signature of the person authorized by the employer to perform the change. The tag shall be maintained at the compressor.

(6) For compressors that are not oil-lubricated, the employer shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.

(7) For oil-lubricated compressors, the employer shall use a high-temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.

(8) The employer shall ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines.

(9) The employer shall use only the respirator manufacturer's NIOSH-approved breathing-gas containers, marked and maintained in accordance with the Quality Assurance provisions of the NIOSH approval for the SCBA as issued in accordance with the NIOSH respirator-certification standard at 42 CFR part 84.

(j) *Identification of filters, cartridges, and canisters.* The employer shall ensure that all filters, cartridges and canisters used in the workplace are labeled and color coded with the NIOSH approval label and that the label is not removed and remains legible.

(k) *Training and information.* This paragraph requires the employer to provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary. This paragraph also requires the employer to provide the basic information on respirators in appendix D of this section to employees who wear respirators when not required by this section or by the employer to do so.

(1) The employer shall ensure that each employee can demonstrate knowledge of at least the following:

(i) Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;

(ii) What the limitations and capabilities of the respirator are;

(iii) How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;

(iv) How to inspect, put on and remove, use, and check the seals of the respirator;

(v) What the procedures are for maintenance and storage of the respirator;

(vi) How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and

(vii) The general requirements of this section.

(2) The training shall be conducted in a manner that is understandable to the employee.

(3) The employer shall provide the training prior to requiring the employee to use a respirator in the workplace.

(4) An employer who is able to demonstrate that a new employee has received training within the last 12 months that addresses the elements specified in paragraph (k)(1)(i) through (vii) is not required to repeat such training provided that, as required by paragraph (k)(1), the employee can demonstrate knowledge of those element(s). Previous training not repeated initially by the employer must be provided no later than 12 months from the date of the previous training.

(5) Retraining shall be administered annually, and when the following situations occur:

(i) Changes in the workplace or the type of respirator render previous training obsolete;

(ii) Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or

(iii) Any other situation arises in which retraining appears necessary to ensure safe respirator use.

(6) The basic advisory information on respirators, as presented in appendix D of this section, shall be provided by the employer in any written or oral format, to employees who wear respirators when such use is not required by this section or by the employer.

(l) *Program evaluation.* This section requires the employer to conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly.

(1) The employer shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

(2) The employer shall regularly consult employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

(i) Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);

(ii) Appropriate respirator selection for the hazards to which the employee is exposed;

(iii) Proper respirator use under the workplace conditions the employee encounters; and

(iv) Proper respirator maintenance.

(m) *Recordkeeping.* This section requires the employer to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist the employer in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

(1) *Medical evaluation.* Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020.

(2) *Fit testing.* (i) The employer shall establish a record of the qualitative

and quantitative fit tests administered to an employee including:

(A) The name or identification of the employee tested;

(B) Type of fit test performed;

(C) Specific make, model, style, and size of respirator tested;

(D) Date of test; and

(E) The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

(ii) Fit test records shall be retained for respirator users until the next fit test is administered.

(3) A written copy of the current respirator program shall be retained by the employer.

(4) Written materials required to be retained under this paragraph shall be made available upon request to affected employees and to the Assistant Secretary or designee for examination and copying.

(n) *Effective date.* Paragraphs (d)(3)(i)(A) and (d)(3)(i)(B) of this section become effective November 22, 2006.

(o) Appendices. Compliance with appendix A, appendix B–1, appendix B–2, appendix C, and appendix D to this section are mandatory.

APPENDIX A TO §1910.134—FIT TESTING PROCEDURES (MANDATORY)

PART I. OSHA-ACCEPTED FIT TEST PROTOCOLS

A. Fit Testing Procedures—General Requirements

The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all OSHA-accepted fit test methods, both QLFT and QNFT.

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.

3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.

4. The test subject shall be instructed to hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.

5. The more acceptable facepieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item A.6. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

(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;

(f) Self-observation in mirror to evaluate fit and respirator position.

8. The test subject shall conduct a user seal check, either the negative and positive pressure seal checks described in appendix B–1 of this section or those recommended by the respirator manufacturer which provide equivalent protection to the procedures in appendix B–1. 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.

9. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear

a respirator while performing her or his duties.

11. 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.

12. Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested 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 applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

14. Test Exercises. (a) Employers must perform the following test exercises for all fit testing methods prescribed in this appendix, except for the CNP quantitative fit testing protocol and the CNP REDON quantitative fit testing protocol. For these two protocols, employers must ensure that the test subjects (*i.e.*, employees) perform the exercise procedure specified in part I.C.4(b) of this appendix for the CNP quantitative fit testing protocol, or the exercise procedure described in part I.C.5(b) of this appendix for the CNP REDON quantitative fit-testing protocol. For the remaining fit testing methods, employers must ensure that employees perform the test exercises in the appropriate test environment in the following manner:

(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.

(3) 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.

(4) 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).

(5) 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 a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

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.

(6) Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)

(7) Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist.

(8) Normal breathing. Same as exercise (1).

(b) Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

B. Qualitative Fit Test (QLFT) Protocols

1. General

(a) The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.

(b) The employer shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

2. Isoamyl Acetate Protocol

NOTE: This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter.

(a) Odor Threshold Screening

Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

(1) Three 1 liter glass jars with metal lids are required.

(2) Odor-free water (e.g., distilled or spring water) at approximately 25 °C (77 °F) shall be used for the solutions.

(3) The isoamyl acetate (IAA) (also known at isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor-free water in a 1 liter jar, closing the

lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.

(4) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.

(5) The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.

(6) A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.

(7) The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.

(8) The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): ''The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil.''

(9) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

(10) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

(11) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

(b) Isoamyl Acetate Fit Test

(1) The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.

(2) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.

(3) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(4) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

(5) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

(6) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.

(7) If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

(8) If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

(9) If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.

(10) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

3. Saccharin Solution Aerosol Protocol

The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste threshold screening. The saccharin taste threshold screening, performed

without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.

(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

(2) The test enclosure shall have a ¾-inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his/her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a sweet taste.

(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. The nozzle is directed away from the nose and mouth of the person. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(5) The threshold check solution is prepared by dissolving 0.83 gram of sodium saccharin USP in 100 ml of warm water. It can be prepared by putting 1 ml of the fit test solution (see (b)(5) below) in 100 ml of distilled water.

(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

(7) Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted. If the test subject reports tasting the sweet taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

(10) The test conductor will take note of the number of squeezes required to solicit a taste response.

(11) If the saccharin is not tasted after 30 squeezes (step 10), the test subject is unable to taste saccharin and may not perform the saccharin fit test.

NOTE TO PARAGRAPH 3(a): If the test subject eats or drinks something sweet before the screening test, he/she may be unable to taste the weak saccharin solution.

(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

(14) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every four hours.

(b) Saccharin solution aerosol fit test procedure.

(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

(2) The fit test uses the same enclosure described in 3. (a) above.

(3) The test subject shall don the enclosure while wearing the respirator selected in section I. A. of this appendix. The respirator shall be properly adjusted and equipped with a particulate filter(s).

(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(5) The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 ml of warm water.

(6) As before, the test subject shall breathe through the slightly open mouth with tongue extended, and report if he/she tastes the sweet taste of saccharin.

(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of saccharin fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test. A minimum of 10 squeezes is required.

(8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

(9) Every 30 seconds the aerosol concentration shall be replenished using one half the original number of squeezes used initially (e.g., 5, 10 or 15).

(10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected. If the

test subject does not report tasting the saccharin, the test is passed.

(11) If the taste of saccharin is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

(12) Since the nebulizer has a tendency to clog during use, the test operator must make periodic checks of the nebulizer to ensure that it is not clogged. If clogging is found at the end of the test session, the test is invalid.

4. Bitrex™ (Denatonium Benzoate) Solution Aerosol Qualitative Fit Test Protocol

The Bitrex™ (Denatonium benzoate) solution aerosol QLFT protocol uses the published saccharin test protocol because that protocol is widely accepted. Bitrex is routinely used as a taste aversion agent in household liquids which children should not be drinking and is endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste Threshold Screening.

The Bitrex taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of Bitrex.

(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches (30.5 cm) in diameter by 14 inches (35.6 cm) tall. The front portion of the enclosure shall be clear from the respirator and allow free movement of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

(2) The test enclosure shall have a ¾ inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his or her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a bitter taste.

(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the Threshold Check Solution into the enclosure. This Nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(5) The Threshold Check Solution is prepared by adding 13.5 milligrams of Bitrex to 100 ml of 5% salt (NaCl) solution in distilled water.

(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that the bulb collapses completely, and is then released and allowed to fully expand.

(7) An initial ten squeezes are repeated rapidly and then the test subject is asked whether the Bitrex can be tasted. If the test subject reports tasting the bitter taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

(10) The test conductor will take note of the number of squeezes required to solicit a taste response.

(11) If the Bitrex is not tasted after 30 squeezes (step 10), the test subject is unable to taste Bitrex and may not perform the Bitrex fit test.

(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

(14) The nebulizer shall be thoroughly rinsed in water, shaken to dry, and refilled at least each morning and afternoon or at least every four hours.

(b) Bitrex Solution Aerosol Fit Test Procedure.

(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

(2) The fit test uses the same enclosure as that described in 4. (a) above.

(3) The test subject shall don the enclosure while wearing the respirator selected according to section I. A. of this appendix. The respirator shall be properly adjusted and equipped with any type particulate filter(s).

(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(5) The fit test solution is prepared by adding 337.5 mg of Bitrex to 200 ml of a 5% salt (NaCl) solution in warm water.

(6) As before, the test subject shall breathe through his or her slightly open mouth with tongue extended, and be instructed to report if he/she tastes the bitter taste of Bitrex.

(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test.

(8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

(9) Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes used initially (e.g., 5, 10 or 15).

(10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of Bitrex is detected. If the test subject does not report tasting the Bitrex, the test is passed.

(11) If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

5. Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the ''smoke'' produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

(a) General Requirements and Precautions

(1) The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

(2) Only stannic chloride smoke tubes shall be used for this protocol.

(3) No form of test enclosure or hood for the test subject shall be used.

(4) 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.

(5) The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

(b) Sensitivity Screening Check

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

(1) The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

(2) The test operator shall 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.

(3) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.

(c) Irritant Smoke Fit Test Procedure

(1) The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).

(2) The test subject shall be instructed to keep his/her eyes closed.

(3) The test operator shall direct the stream of irritant smoke from the smoke tube toward the faceseal area of the test 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.

(4) If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.

(5) The exercises identified in section I.A. 14. of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.

(6) If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.

(7) 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.

(8) If a response is produced during this second sensitivity check, then the fit test is passed.

C. Quantitative Fit Test (QNFT) Protocols

The following quantitative fit testing procedures have been demonstrated to be acceptable: Quantitative fit testing using 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; Quantitative fit testing using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a facepiece to quantify the respirator fit.

1. General

(a) The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.

(b) The employer shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

2. Generated Aerosol Quantitative Fit Testing Protocol

(a) Apparatus.

(1) Instrumentation. Aerosol generation, dilution, and measurement systems using particulates (corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS] or sodium chloride) as test aerosols shall be used for quantitative fit testing.

(2) Test chamber. The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the test agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the test agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.

(3) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high efficiency particulate air (HEPA) or P100 series filter supplied by the same manufacturer.

(4) The sampling instrument shall be selected so that a computer record or strip chart record may be made of the test showing the rise and fall of the test agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers that integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.

(5) The combination of substitute air-purifying elements, test agent and test agent concentration shall be such that the test subject is not exposed in excess of an established exposure limit for the test agent at any time during the testing process, based upon the length of the exposure and the exposure limit duration.

(6) The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g., where the respirator is probed), a free air flow is allowed into the sampling line at all times, and there is no interference with the fit or performance of the respirator. The in-mask sampling device (probe) shall be designed and used so that the air sample is drawn from the breathing zone of the test subject, midway between the nose and mouth and with the probe extending into the facepiece cavity at least ¼ inch.

(7) The test setup shall permit the person administering the test to observe the test subject inside the chamber during the test.

(8) The equipment generating the test atmosphere shall maintain the concentration of test agent constant to within a 10 percent variation for the duration of the test.

(9) The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event and its being recorded.

(10) The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.

(11) The exhaust flow from the test chamber shall pass through an appropriate filter (i.e., high efficiency particulate filter) before release.

(12) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.

(13) The limitations of instrument detection shall be taken into account when determining the fit factor.

(14) Test respirators shall be maintained in proper working order and be inspected regularly for deficiencies such as cracks or missing valves and gaskets.

(b) Procedural Requirements.

(1) When performing the initial user seal check using a positive or negative pressure check, the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these pressure checks.

(2) The use of an abbreviated screening QLFT test is optional. Such a test may be utilized in order to quickly identify poor fitting respirators that passed the positive and/or negative pressure test and reduce the amount of QNFT time. The use of the CNC

QNFT instrument in the count mode is another optional method to obtain a quick estimate of fit and eliminate poor fitting respirators before going on to perform a full QNFT.

(3) A reasonably stable test agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain types of test units, the determination of the test agent's stability may be established after the test subject has entered the test environment.

(4) Immediately after the subject enters the test chamber, the test agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half mask or 1 percent for a full facepiece respirator.

(5) A stable test agent concentration shall be obtained prior to the actual start of testing.

(6) Respirator restraining straps shall not be over-tightened for testing. The straps shall be adjusted by the wearer without assistance from other persons to give a reasonably comfortable fit typical of normal use. The respirator shall not be adjusted once the fit test exercises begin.

(7) The test shall be terminated whenever any single peak penetration exceeds 5 percent for half masks and 1 percent for full facepiece respirators. The test subject shall be refitted and retested.

(8) Calculation of fit factors.

(i) The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration measured inside the respirator for each test exercise except the grimace exercise.

(ii) The average test chamber concentration shall be calculated as the arithmetic average of the concentration measured before and after each test (i.e., 7 exercises) or the arithmetic average of the concentration measured before and after each exercise or the true average measured continuously during the respirator sample.

(iii) The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:

(*A*) Average peak penetration method means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each exercise except the grimace exercise. Integrators or computers that calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.

(*B*) Maximum peak penetration method means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.

(*C*) Integration by calculation of the area under the individual peak for each exercise except the grimace exercise. This includes computerized integration.

(*D*) The calculation of the overall fit factor using individual exercise fit factors involves first converting the exercise fit factors to penetration values, determining the average, and then converting that result back to a fit factor. This procedure is described in the following equation:

$$\text{Overall Fit Factor} = \frac{\text{Number of exercises}}{1/\text{ff}_1 + 1/\text{ff}_2 + 1/\text{ff}_3 + 1/\text{ff}_4 + 1/\text{ff}_5 + 1/\text{ff}_7 + 1/\text{ff}_8}$$

Where ff_1, ff_2, ff_3, etc. are the fit factors for exercises 1, 2, 3, etc.

(9) The test subject shall not be permitted to wear a half mask or quarter facepiece respirator unless a minimum fit factor of 100 is obtained, or a full facepiece respirator unless a minimum fit factor of 500 is obtained.

(10) Filters used for quantitative fit testing shall be replaced whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media.

3. Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol.

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (Portacount™) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, 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, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The CNC instrument

manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator and a minimum fit factor pass level of at least 500 is required for a full facepiece negative pressure respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Portacount Fit Test Requirements. (1) Check the respirator to make sure the sampling probe and line are properly attached to the facepiece and that the respirator is fitted with a particulate filter capable of preventing significant penetration by the ambient particles used for the fit test (e.g., NIOSH 42 CFR 84 series 100, series 99, or series 95 particulate filter) per manufacturer's instruction.

(2) Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.

(3) Check the following conditions for the adequacy of the respirator fit: Chin properly placed; Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendency of the respirator to slip; Self-observation in a mirror to evaluate fit and respirator position.

(4) Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting facepiece, try another size of the same model respirator, or another model of respirator.

(5) Follow the manufacturer's instructions for operating the Portacount and proceed with the test.

(6) The test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

(7) After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

(b) Portacount Test Instrument.

(1) The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.

(2) Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this Appendix.

(3) A record of the test needs to be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

4. Controlled negative pressure (CNP) quantitative fit testing protocol.

The CNP protocol provides an alternative to aerosol fit test methods. The CNP fit test method technology is based on exhausting air from a temporarily sealed respirator facepiece to generate and then maintain a constant negative pressure inside the facepiece. The rate of air exhaust is controlled so that a constant negative pressure is maintained in the respirator during the fit test. The level of pressure is selected to replicate the mean inspiratory pressure that causes leakage into the respirator under normal use conditions. With pressure held constant, air flow out of the respirator is equal to air flow into the respirator. Therefore, measurement of the exhaust stream that is required to hold the pressure in the temporarily sealed respirator constant yields a direct measure of leakage air flow into the respirator. The CNP fit test method measures leak rates through the facepiece as a method for determining the facepiece fit for negative pressure respirators. The CNP instrument manufacturer Occupational Health Dynamics of Birmingham, Alabama also provides attachments (sampling manifolds) that replace the filter cartridges to permit fit testing in an employee's own respirator. To perform the test, the test subject closes his or her mouth and holds his/her breath, after which an air pump removes air from the respirator facepiece at a pre-selected constant pressure. The facepiece fit is expressed as the leak rate through the facepiece, expressed as milliliters per minute. The quality and validity of the CNP fit tests are determined by the degree to which the in-mask pressure tracks the test pressure during the system measurement time of approximately five seconds. Instantaneous feedback in the form of a real-time pressure trace of the in-mask pressure is provided and used to determine test validity and quality. A minimum fit factor pass level of 100 is necessary for a half-mask respirator and a minimum fit factor of at least 500 is required for a full facepiece respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) CNP Fit Test Requirements.

(1) The instrument shall have a non-adjustable test pressure of 15.0 mm water pressure.

(2) The CNP system defaults selected for test pressure shall be set at −15 mm of water (-0.58 inches of water) and the modeled inspiratory flow rate shall be 53.8 liters per minute for performing fit tests.

NOTE: CNP systems have built-in capability to conduct fit testing that is specific to unique work rate, mask, and gender situations that might apply in a specific workplace. Use of system default values, which were selected to represent respirator wear with medium cartridge resistance at a low-moderate work rate, will allow inter-test comparison of the respirator fit.)

(3) The individual who conducts the CNP fit testing shall be thoroughly trained to perform the test.

(4) The respirator filter or cartridge needs to be replaced with the CNP test manifold. The inhalation valve downstream from the manifold either needs to be temporarily removed or propped open.

(5) The employer must train the test subject to hold his or her breath for at least 10 seconds.

(6) The test subject must don the test respirator without any assistance from the test administrator who is conducting the CNP fit test. The respirator must not be adjusted once the fit-test exercises begin. Any adjustment voids the test, and the test subject must repeat the fit test.

(7) The QNFT protocol shall be followed according to section I. C. 1. of this appendix with an exception for the CNP test exercises.

(b) CNP Test Exercises.

(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject needs to hold head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply for 1 minute, being careful not to hyperventilate. After the deep breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during test measurement.

(3)Turning head side to side. Standing in place, the subject shall slowly turn his or her head from side to side between the extreme positions on each side for 1 minute. The head shall be held at each extreme momentarily so the subject can inhale at each side. After the turning head side to side exercise, the subject needs to hold head full left and hold his or her breath for 10 seconds during test measurement. Next, the subject needs to hold head full right and hold his or her breath for 10 seconds during test measurement.

(4) Moving head up and down. Standing in place, the subject shall slowly move his or her head up and down for 1 minute. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling). After the moving head up and down exercise, the subject shall hold his or her head full up and hold his or her breath for 10 seconds during test measurement. Next, the subject shall hold his or her head full down and hold his or her breath for 10 seconds during test measurement.

(5) 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 a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song for 1 minute. After the talking exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(6) Grimace. The test subject shall grimace by smiling or frowning for 15 seconds.

(7) Bending Over. The test subject shall bend at the waist as if he or she were to touch his or her toes for 1 minute. Jogging in place shall be substituted for this exercise in those test environments such as shroud-type QNFT units that prohibit bending at the waist. After the bending over exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(8) Normal Breathing. The test subject shall remove and re-don the respirator within a one-minute period. Then, in a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement. After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of a respirator shall be tried.

(c) CNP Test Instrument.

(1) The test instrument must have an effective audio-warning device, or a visual-warning device in the form of a screen tracing, that indicates when the test subject fails to hold his or her breath during the test. The test must be terminated and restarted from the beginning when the test subject fails to hold his or her breath during the test. The test subject then may be refitted and retested.

(2) A record of the test shall be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style and size of respirator used; and date tested.

5. Controlled negative pressure (CNP) REDON quantitative fit testing protocol.

(a) When administering this protocol to test subjects, employers must comply with the requirements specified in paragraphs (a) and (c) of part I.C.4 of this appendix (''Controlled negative pressure (CNP) quantitative fit testing protocol''), as well as use the test exercises described below in paragraph (b) of this protocol instead of the test exercises

specified in paragraph (b) of part I.C.4 of this appendix.

(b) Employers must ensure that each test subject being fit tested using this protocol follows the exercise and measurement procedures, including the order of administration, described below in Table A–1 of this appendix.

TABLE A–1—CNP REDON QUANTITATIVE FIT TESTING PROTOCOL

Exercises [1]	Exercise procedure	Measurement procedure
Facing Forward	Stand and breathe normally, without talking, for 30 seconds.	Face forward, while holding breath for 10 seconds.
Bending Over	Bend at the waist, as if going to touch his or her toes, for 30 seconds.	Face parallel to the floor, while holding breath for 10 seconds
Head Shaking	For about three seconds, shake head back and forth vigorously several times while shouting.	Face forward, while holding breath for 10 seconds
REDON 1	Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask.	Face forward, while holding breath for 10 seconds.
REDON 2	Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask again.	Face forward, while holding breath for 10 seconds.

[1] Exercises are listed in the order in which they are to be administered.

(c) After completing the test exercises, the test administrator must question each test subject regarding the comfort of the respirator. When a test subject states that the respirator is unacceptable, the employer must ensure that the test administrator repeats the protocol using another respirator model.

(d) Employers must determine the overall fit factor for each test subject by calculating the harmonic mean of the fit testing exercises as follows:

$$\text{Overall Fit Factor} = \frac{N}{\left[1/FF_1 + 1/FF_2 + \ldots\ 1/FF_N\right]}$$

Where:

N = The number of exercises;

FF_1 = The fit factor for the first exercise;

FF_2 = The fit factor for the second exercise; and

FF_N = The fit factor for the nth exercise.

PART II. NEW FIT TEST PROTOCOLS

A. Any person may submit to OSHA an application for approval of a new fit test protocol. If the application meets the following criteria, OSHA will initiate a rulemaking proceeding under section 6(b)(7) of the OSH Act to determine whether to list the new protocol as an approved protocol in this appendix A.

B. The application must include a detailed description of the proposed new fit test protocol. This application must be supported by either:

1. A test report prepared by an independent government research laboratory (e.g., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Institute for Standards and Technology) stating that the laboratory has tested the protocol and had found it to be accurate and reliable; or

2. An article that has been published in a peer-reviewed industrial hygiene journal describing the protocol and explaining how test data support the protocol's accuracy and reliability.

C. If OSHA determines that additional information is required before the Agency commences a rulemaking proceeding under this section, OSHA will so notify the applicant and afford the applicant the opportunity to submit the supplemental information. Initiation of a rulemaking proceeding will be deferred until OSHA has received and evaluated the supplemental information.

APPENDIX B–1 TO § 1910.134: USER SEAL CHECK PROCEDURES (MANDATORY)

The individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and negative pressure checks listed in this appendix, or the respirator manufacturer's recommended user seal check method shall be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

I. Facepiece Positive and/or Negative Pressure Checks

A. *Positive pressure check.* Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

B. *Negative pressure check.* Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently

so that the facepiece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

II. Manufacturer's Recommended User Seal Check Procedures

The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

APPENDIX B–2 TO § 1910.134: RESPIRATOR CLEANING PROCEDURES (MANDATORY)

These procedures are provided for employer use when cleaning respirators. They are general in nature, and the employer as an alternative may use the cleaning recommendations provided by the manufacturer of the respirators used by their employees, provided such procedures are as effective as those listed here in appendix B–2. Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth in appendix B–2, i.e., must ensure that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user.

I. Procedures for Cleaning Respirators

A. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.

B. Wash components in warm (43 °C [110 °F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.

C. Rinse components thoroughly in clean, warm (43 °C [110 °F] maximum), preferably running water. Drain.

D. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:

1. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 °C (110 °F); or,

2. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6–8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43 °C (110 °F); or,

3. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.

E. Rinse components thoroughly in clean, warm (43 °C [110 °F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.

F. Components should be hand-dried with a clean lint-free cloth or air-dried.

G. Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.

H. Test the respirator to ensure that all components work properly.

APPENDIX C TO § 1910.134: OSHA RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE (MANDATORY)

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of part A, do not require a medical examination.

To the employee:

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date: _____
2. Your name: _____
3. Your age (to nearest year): _____
4. Sex (circle one): Male/Female
5. Your height: ____ ft. ____ in.
6. Your weight: ____ lbs.
7. Your job title: _____
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _____
9. The best time to phone you at this number: ____
10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No
11. Check the type of respirator you will use (you can check more than one category):

a. ____ N, R, or P disposable respirator (filter-mask, non-cartridge type only).
b. ____ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).

12. Have you worn a respirator (circle one): Yes/No

7 If ''yes,'' what type(s): _____

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle ''yes'' or ''no'').

1. Do you *currently* smoke tobacco, or have you smoked tobacco in the last month: Yes/No
2. Have you *ever had* any of the following conditions?
   a. Seizures: Yes/No
   b. Diabetes (sugar disease): Yes/No
   c. Allergic reactions that interfere with your breathing: Yes/No
   d. Claustrophobia (fear of closed-in places): Yes/No
   e. Trouble smelling odors: Yes/No
3. Have you *ever had* any of the following pulmonary or lung problems?
   a. Asbestosis: Yes/No
   b. Asthma: Yes/No
   c. Chronic bronchitis: Yes/No
   d. Emphysema: Yes/No
   e. Pneumonia: Yes/No
   f. Tuberculosis: Yes/No
   g. Silicosis: Yes/No
   h. Pneumothorax (collapsed lung): Yes/No
   i. Lung cancer: Yes/No
   j. Broken ribs: Yes/No
   k. Any chest injuries or surgeries: Yes/No
   l. Any other lung problem that you've been told about: Yes/No
4. Do you *currently* have any of the following symptoms of pulmonary or lung illness?
   a. Shortness of breath: Yes/No
   b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No
   c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No
   d. Have to stop for breath when walking at your own pace on level ground: Yes/No
   e. Shortness of breath when washing or dressing yourself: Yes/No
   f. Shortness of breath that interferes with your job: Yes/No
   g. Coughing that produces phlegm (thick sputum): Yes/No
   h. Coughing that wakes you early in the morning: Yes/No
   i. Coughing that occurs mostly when you are lying down: Yes/No
   j. Coughing up blood in the last month: Yes/No
   k. Wheezing: Yes/No
   l. Wheezing that interferes with your job: Yes/No
   m. Chest pain when you breathe deeply: Yes/No
   n. Any other symptoms that you think may be related to lung problems: Yes/No
5. Have you *ever had* any of the following cardiovascular or heart problems?
   a. Heart attack: Yes/No
   b. Stroke: Yes/No
   c. Angina: Yes/No
   d. Heart failure: Yes/No
   e. Swelling in your legs or feet (not caused by walking): Yes/No
   f. Heart arrhythmia (heart beating irregularly): Yes/No
   g. High blood pressure: Yes/No
   h. Any other heart problem that you've been told about: Yes/No
6. Have you *ever had* any of the following cardiovascular or heart symptoms?
   a. Frequent pain or tightness in your chest: Yes/No
   b. Pain or tightness in your chest during physical activity: Yes/No
   c. Pain or tightness in your chest that interferes with your job: Yes/No
   d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
   e. Heartburn or indigestion that is not related to eating: Yes/No
   f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No
7. Do you *currently* take medication for any of the following problems?
   a. Breathing or lung problems: Yes/No
   b. Heart trouble: Yes/No
   c. Blood pressure: Yes/No
   d. Seizures: Yes/No
8. If you've used a respirator, have you *ever had* any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)
   a. Eye irritation: Yes/No
   b. Skin allergies or rashes: Yes/No
   c. Anxiety: Yes/No
   d. General weakness or fatigue: Yes/No
   e. Any other problem that interferes with your use of a respirator: Yes/No
9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you *ever lost* vision in either eye (temporarily or permanently): Yes/No
11. Do you *currently* have any of the following vision problems?

a. Wear contact lenses: Yes/No
b. Wear glasses: Yes/No
c. Color blind: Yes/No
d. Any other eye or vision problem: Yes/No

12. Have you *ever had* an injury to your ears, including a broken ear drum: Yes/No
13. Do you *currently* have any of the following hearing problems?
a. Difficulty hearing: Yes/No
b. Wear a hearing aid: Yes/No
c. Any other hearing or ear problem: Yes/No
14. Have you *ever had* a back injury: Yes/No
15. Do you *currently* have any of the following musculoskeletal problems?
a. Weakness in any of your arms, hands, legs, or feet: Yes/No
b. Back pain: Yes/No
c. Difficulty fully moving your arms and legs: Yes/No
d. Pain or stiffness when you lean forward or backward at the waist: Yes/No
e. Difficulty fully moving your head up or down: Yes/No
f. Difficulty fully moving your head side to side: Yes/No
g. Difficulty bending at your knees: Yes/No
h. Difficulty squatting to the ground: Yes/No
i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No
j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No
If ''yes,'' do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No
2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (*e.g.*, gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No
If ''yes,'' name the chemicals if you know them: _____
3. Have you ever worked with any of the materials, or under any of the conditions, listed below:
a. Asbestos: Yes/No
b. Silica (*e.g.*, in sandblasting): Yes/No
c. Tungsten/cobalt (*e.g.*, grinding or welding this material): Yes/No
d. Beryllium: Yes/No
e. Aluminum: Yes/No
f. Coal (for example, mining): Yes/No
g. Iron: Yes/No
h. Tin: Yes/No
i. Dusty environments: Yes/No
j. Any other hazardous exposures: Yes/No
If ''yes,'' describe these exposures: _____
_____
4. List any second jobs or side businesses you have: _____
_____
5. List your previous occupations: _____
_____
6. List your current and previous hobbies: _____
_____
7. Have you been in the military services? Yes/No
If ''yes,'' were you exposed to biological or chemical agents (either in training or combat): Yes/No
8. Have you ever worked on a HAZMAT team? Yes/No
9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No
If ''yes,'' name the medications if you know them: _____
10. Will you be using any of the following items with your respirator(s)?
a. HEPA Filters: Yes/No
b. Canisters (for example, gas masks): Yes/No
c. Cartridges: Yes/No
11. How often are you expected to use the respirator(s) (circle ''yes'' or ''no'' for all answers that apply to you)?:
a. Escape only (no rescue): Yes/No
b. Emergency rescue only: Yes/No
c. Less than 5 hours *per week:* Yes/No
d. Less than 2 hours *per day:* Yes/No
e. 2 to 4 hours *per day:* Yes/No
f. Over 4 hours *per day:* Yes/No
12. During the period you are using the respirator(s), is your work effort:
a. *Light* (less than 200 kcal per hour): Yes/No
If ''yes,'' how long does this period last during the average shift:_____hrs._____mins.
Examples of a light work effort are *sitting* while writing, typing, drafting, or performing light assembly work; or *standing* while operating a drill press (1–3 lbs.) or controlling machines.
b. *Moderate* (200 to 350 kcal per hour): Yes/No
If ''yes,'' how long does this period last during the average shift:_____hrs._____mins.
Examples of moderate work effort are *sitting* while nailing or filing; *driving* a truck or bus in urban traffic; *standing* while drilling,

nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; *walking* on a level surface about 2 mph or down a 5-degree grade about 3 mph; or *pushing* a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

c. *Heavy* (above 350 kcal per hour): Yes/No

If ''yes,'' how long does this period last during the average shift:_____hrs._____mins.

Examples of heavy work are *lifting* a heavy load (about 50 lbs.) from the floor to your waist or shoulder; *working* on a loading dock; *shoveling; standing* while bricklaying or chipping castings; *walking* up an 8-degree grade about 2 mph; *climbing* stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No

If ''yes,'' describe this protective clothing and/or equipment: _____

_____

14. Will you be working under hot conditions (temperature exceeding 77 °F): Yes/No
15. Will you be working under humid conditions: Yes/No
16. Describe the work you'll be doing while you're using your respirator(s):

_____

_____

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

_____

_____

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift _____

Name of the second toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

Name of the third toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

The name of any other toxic substances that you'll be exposed to while using your respirator:

_____

_____

_____

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

_____

APPENDIX D TO §1910.134 (MANDATORY) INFORMATION FOR EMPLOYEES USING RESPIRATORS WHEN NOT REQUIRED UNDER THE STANDARD

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

[63 FR 1270, Jan. 8, 1998; 63 FR 20098, 20099, Apr. 23, 1998, as amended at 69 FR 46993, Aug. 4, 2004; 71 FR 16672, Apr. 3, 2006; 71 FR 50187, Aug. 24, 2006; 73 FR 75584, Dec. 12, 2008; 76 FR 33607, June 8, 2011; 77 FR 46949, Aug. 7, 2012]

§1910.135 Head protection.

(a) *General requirements.* (1) The employer shall ensure that each affected employee wears a protective helmet when working in areas where there is a

Chapter 17: North Carolina Asbestos Information

NORTH CAROLINA ASBESTOS INFORMATION

Sections:

Requirements for Conducting Asbestos Work in North Carolina

North Carolina General Statutes

North Carolina Asbestos Hazard Management Program Rules

NC HHCU, Asbestos Hazard Management Program Common Questions

Asbestos Permit Application and Notification for Demolition/Renovation form
Revision for Permit/Notification form
Asbestos Waste Shipment Record form
Asbestos Accreditation Application form

REQUIREMENTS FOR CONDUCTING ASBESTOS WORK IN NORTH CAROLINA

This listing provides a partial synopsis of requirements and regulations affecting contractors performing asbestos management/abatement activities in North Carolina. Brief discussions of some of the regulatory requirements are included:

Asbestos Hazard Emergency Response Act (AHERA)

(40 CFR Part 763; NC Gen. Stat. §130A-444 through §130A-451)

40 CFR Part 763 regulates asbestos activities in public and private elementary and secondary schools. The rule requires schools to inspect for asbestos containing materials, develop asbestos management plans, and implement response actions in a timely manner. To carry out these activities, schools must use trained individuals. The NC Asbestos Hazard Management Program (AHMP), established by N.C. Gen. Stats. §130A-444 through §130A-451, requires that these trained individuals become accredited by passing an EPA approved course and examination. After successful completion of the EPA approved course(s), each individual must obtain an accreditation number from the NC Health Hazards Control Unit (HHCU).

For more information about the administration of this program in North Carolina, contact:

NC Department of Health and Human Services
Division of Public Health
Occupational and Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: 919-707-5950

Asbestos Hazard Management Program

(NC Gen. Stat. §130A, Article 19; 10A N.C.A.C. 41C .0601-.0608, .0611)

This statute governs requirements pertaining to:

1) Criteria for asbestos exposure in public areas;
2) Accreditation of persons conducting asbestos management activities;
3) Obtaining and maintaining course approval; and
4) Obtaining a permit prior to conducting asbestos removal projects.

For more information about the administration of this program in North Carolina, contact:

NC Department of Health and Human Services
Division of Public Health
Occupational and Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: 919-707-5950

National Emissions Standards for Hazardous Air Pollutants (NESHAP)

(40 CFR Part 61, Subpart M; 10A N.C.A.C. 41C .0609 and .0610)

NESHAP standards address activities associated with the demolition and renovation of buildings which may contain asbestos, as well as the handling and disposal of asbestos containing waste material. Notification is required for demolitions whether or not asbestos is present. Notification is also required for building renovations when asbestos is present. Air emissions of asbestos are addressed as well. To provide notification or for more information, contact:

NC Department of Health and Human Services
Division of Public Health
Occupational and Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: 919-707-5950

Local Ordinances

The following counties have been delegated authority by the US Environmental Protection Agency to enforce the NESHAP within their jurisdictions. The following county agencies must be notified, in addition to the NCDHHS, Health Hazards Control Unit, of demolitions and asbestos removal projects occurring within their county:

Buncombe County
Western North Carolina Regional Air Pollution Control Agency
125 South Lexington Ave., Suite 101
Asheville, NC 28801
Telephone: 828-250-6777

Forsyth County
Environmental Assistance and Protection
Forsyth County Government Center
201 N. Chestnut Street, 5th Floor
Winston-Salem, NC 27101
Telephone: 336-703-2440

Mecklenburg County
Mecklenburg County Land Use and Environmental Services Agency
Mecklenburg Air Quality
2145 Suttle Avenue
Charlotte, NC 28208
Telephone: 704-336-5430

NC Occupational Safety and Health Standards for the Construction Industry
(29 CFR 1926 and 29 CFR 1910; 13 N.C.A.C. 7C .0101)

29 CFR 1926.1101 establishes requirements for construction and related work involving asbestos, including demolition, removal, installation and transportation.

29 CFR 1010.1001 establishes requirements for general industry.

For more information, contact either of the following:

NC Department of Labor
OSH Division
Bureau of Consultative Services
4 West Edenton Street
Raleigh, NC 27601
Telephone: 919-807-2899

NC Department of Labor
OSH Division
Bureau of Education, Training &
Technical Assistance
4 West Edenton Street
Raleigh, NC 27601
Telephone: 919-807-2875
1-800-NC LABOR (in state only)
(1-800-625-2267)
919-807-2823 (local & out of state)

Transportation
(49 CFR 173.1090)

The NC Department of Transportation enforces requirements for transporting and manifesting asbestos and asbestos waste. For more information, contact:

Motor Carrier Enforcement Administration Section
NC State Highway Patrol
512 N. Salisbury Street
Raleigh, NC 27604
Telephone: 919-715-8683 Ext. #8

Landfill Operational Requirements
(10 N.C.A.C. 10G .0505)

These rules regulate the disposal of asbestos waste in permitted solid waste landfills. Approval of waste to be disposed in North Carolina landfills is regulated by the NC DENR. Division of Solid Waste Management, Solid Waste Section. Final acceptance of the waste is the decision of the local landfill operator who should be contacted directly. For more information on the landfills, go use the following website link or contact: https://deq.nc.gov/about/divisions/waste-management/waste-management-rules-data/solid-waste-management-annual-reports/solid-waste-permitted-facility-list

Eastern District
NC DENR
Fayetteville Regional Office
Solid Waste Section
225 Green Street, Suite 714
Fayetteville, NC 28301
910-433-3300

Central Office
NC DENR
1646 Mail Service Center
Raleigh, NC 27609-1646
919-707-8200

Western District
NC DENR
Asheville Regional Office
Solid Waste section
2090 US Hwy 70
Swannanoa, NC
828-296-4500

Guideline Criteria for Asbestos Abatement

The NC Department of Administration, Division of State Construction requires that this document be utilized to develop an asbestos abatement specification plan for state-owned buildings.

The NC Department of Education has the same requirements for abatement projects in public school buildings.

For more information, contact either of the following:

NC Department of Administration
State Construction Office
NC Education Building, Suite 450
1307 Mail Service Center
Raleigh, North Carolina 27699-1307
Telephone: 919-807-4076

NC Department of Health and Human Services
Division of Public Health
Occupational and Environmental Epidemiology Branch
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: 919-707-5950

Dusty Trades Act

(NC Gen. Stat. §97, Article 1, Section 97-61.1 through 97-73)

The Dusty Trades Program as administered by the NC DHHS, Division of Public Health, was discontinued June 30, 2002. The NC Industrial Commission now holds the authority for enforcing compliance with the statutory requirements set out by the Workers Compensation Act.

Licensing for Contractors

Licensing is required for performing general contract work, including asbestos contracting, in North Carolina. For more information, contact:

NC Licensing Board for General Contractors

Mailing Address:	Physical Address:
P.O. Box 17187	3739 National Drive, Suite 225
Raleigh, NC 27619	Raleigh, NC 27612

Telephone: 919-571-4183
Website: http://www.nclbgc.org

North Carolina

General "Asbestos" Requirements for Renovation and/or Demolition Activities

Asbestos is a naturally occurring fibrous mineral that has been used in over 3,000 different building materials. Examples of typical building materials that have been known to contain asbestos include, but not limited to, are trowel-applied or sprayed-on decorative treatments, fireproofing, certain insulation products, vinyl flooring, gypsum wall board, joint compounds, mastics, plaster, ceiling tiles, certain paints and cementitious materials such as siding or roofing. You can still purchase some products today that contain asbestos. This mineral is known to cause lung cancer, asbestosis (scarring of the lung tissue) and mesothelioma (a cancer of the lining of the lung or abdominal cavity). Disturbing asbestos in a building during a renovation or demolition activity could result in unnecessary occupant exposure, building contamination, additional cost in project delays and cleanup, and may lead to regulatory violations, penalty assessments and potential litigation.

To protect people from this potential hazard, the North Carolina Department of Health and Human Services, Division of Public Health, Health Hazards Control Unit (HHCU) administers the National Emission Standards for Hazardous Air Pollutants (NESHAP) – Asbestos Regulation (40 CFR, Part 61, Subpart M) in all but three counties in NC. Forsyth, Buncombe and Mecklenburg Counties have their own Asbestos and NESHAP programs and should be contacted directly for their local program requirements. This federal regulation ***requires building owners or operator*** to thoroughly inspect the facility/buildings (e.g. commercial, industrial, dwelling units with more than 4 dwelling units) or part of the affected facility where the demolition or renovation operation will occur for the presence of asbestos-containing material (ACM) prior to the commencement of the renovation or demolition activity. Asbestos-containing material means material which contains more than one percent (1%) asbestos.

The HHCU recommends an asbestos inspection always be conducted (to include single family residential dwellings and dwellings with four or fewer dwelling units) by a NC accredited asbestos inspector prior to renovation or demolition activities in order for the owner and contractor to know whether or not ACM is present, what precautions should be taken and whether or not NC accredited asbestos removal personnel or state-issued permit would be required to remove the asbestos materials. Accreditation may be verified by asking to see the NC individual accreditation card issued by the HHCU before beginning the project. You can also verify individual accreditation by calling the HHCU or visiting our website and using the "Find Asbestos Professionals" feature.

The asbestos inspection/survey should inform the owner of the presence, location, quantity, type and condition of the asbestos-containing materials. This information will help with project planning, minimize the potential for asbestos exposure to occupants and workers, prevent unnecessary property contamination along with the associated costs to remediate, and ensure the proper disposal of asbestos-containing waste.

When conducting a demolition activity, a demolition notification is required to be submitted to the HHCU. This notification is in addition to any other local demolition permits that may be issued by other local municipal or county offices except for Forsyth, Buncombe and Mecklenburg Counties. The demolition notification must be submitted to the HHCU at least 10 working days prior to the commencement of the demolition activity. Please note that a demolition notification is required, even if no asbestos was identified by the facility/building inspection.

The HHCU also administers the NC Asbestos Hazard Management Program found under North Carolina General Statutes Chapter 130A, Article 19, §130A-444 through 452 and the rules adopted to implement the Asbestos Hazard Management Program, 10A N.C.A.C. 41C .0600. These rules apply to

asbestos management activities such as accreditation, inspections, air monitoring and asbestos removals. The requirements apply state-wide in all counties and require that all asbestos management activities be conducted by personnel accredited by the HHCU.

Generally speaking, all friable and regulated ACM in quantities greater than 3 square or linear feet that will be disturbed by a renovation or demolition activity, must be properly removed by NC accredited asbestos workers and supervisors. The removal must occur before beginning renovation or demolition activities that will break up, dislodge or similarly disturb the material or preclude access to the material for subsequent removal.

Friable ACM means any material that when dry can be broken, crumbled, pulverized or reduced to powder by hand pressure. Friable ACM also includes previously non-friable material after such material becomes damaged to the extent that when dry it can be crumbled, pulverized, or reduced to a powder by hand pressure. Regulated ACM includes friable material and non-friable materials that will be or has been subject to sanding, cutting, grinding, abrading, or those materials that have a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of the demolition or renovation operations.

The NC law requires an asbestos removal permit when the threshold amount of 35 cubic feet, 160 square feet or 260 linear feet of friable or regulated asbestos material is to be removed. There may be additional AHMP rule requirements that must be met depending on the type of building and the amount of asbestos to be removed.

The information contained in this article is intended as a general overview and is not intended to be all inclusive and should not be interpreted as such. All applicable renovation or demolition activities must comply with the North Carolina General Statutes Chapter 130A, Article 19, §130A-444 through 452 and the rules adopted to implement the Asbestos Hazard Management Program, 10A N.C.A.C. 41C .0600. If your project involves Pre-78 housing or child-occupied facilities, please be aware that additional lead-based paint requirements may also apply in addition to the asbestos requirements. There may be times when a contractor will need both accreditation for asbestos and certification for lead-based paint.

To further assist you with understanding the state and federal asbestos requirements or to find accredited asbestos professionals you can visit our website at: http://www.epi.state.nc.us/epi/asbestos/ahmp.html.

For questions regarding specific applicability of the asbestos requirements, you are encouraged to contact the HHCU to discuss the project in detail. If you would like to have a presentation addressing asbestos regulations at a meeting or conference, or if you have specific questions, please feel free to contact the HHCU at (919) 707-5950.

Typical Cementitious House Siding



Typical Suspect Asbestos Containing Materials found in Homes

(Wall Board, Textured Ceiling)



(Floor Tile)



Blown in Attic Insulation



Pipe Insulation



Public Health
HEALTH AND HUMAN SERVICES

RICHARD O. BRAJER
Secretary

DANIEL STALEY
Director, Division of Public Health

June 1, 2016

MEMORANDUM

To: Asbestos/Demolition Contractors

From: Manager, Health Hazards Control Unit

Subject: Asbestos Renovation/Demolition (R/D) Requirements
National Emission Standards for Hazardous Air Pollutants (NESHAP)

Enclosed is information concerning the National Emission Standards for Hazardous Air Pollutants (NESHAP)–Asbestos regulations (40 CFR, Part 61, Subpart M). Also included is a copy of the regulations and a list of persons to be notified of each R/D project and a description of their related area of responsibility. Administration of asbestos R/D activities under the NESHAP is the responsibility of the Health Hazards Control Unit (HHCU).

The NESHAP regulations require the following:

Inspection:

A thorough inspection of the affected area for the presence of asbestos by a NC accredited asbestos inspector is required before beginning any R/D activity.

Notification:

1) A notification 10 working days prior to beginning renovations involving the removal of more than 160 sq. ft., 260 ln. ft., or 35 cu. ft. of regulated asbestos-containing material (RACM);

2) A notification 10 working days prior to beginning demolition activities involving the removal of more than 160 sq. ft., 260 ln. ft., or 35 cu. ft. of RACM; and,

3) A notification 10 working days prior to beginning demolition activities even if no asbestos has been identified in the facility.

Copies of DHHS 3768, as well as a form which may be used when revisions of the initial notification are required, may be found in the NORTH CAROLINA ASBESTOS RULES, REGULATIONS, AND PROCEDURES packet available from this office.

Proper Work Practices/No Visible Emissions:

Maintain asbestos adequately wet at all times during the removal process and allow no visible emissions to the outside air.

Proper Disposal:

An **Asbestos Waste Shipment Record (DHHS 3787)**, required for transporting and disposal of asbestos-containing waste materials is included in this packet for your information.

Copies of forms may also be found on our website at:
http://epi.publichealth.nc.gov/asbestos/forms.html

If you have any questions or need additional information concerning notifications, the NESHAP regulations or the North Carolina requirements for asbestos removal permits or accreditations, please contact our office at 919-707-5950.

Your cooperation in protecting and maintaining clean air in North Carolina is greatly appreciated.

ASBESTOS CONTACTS

Statewide

Director, OSHA Division
NC Department of Labor
4 West Edenton Street
Raleigh, NC 27601
Telephone: 919-807-2899

For help with:

OSHA Consultations

Health Hazards Control Unit (HHCU)
NC Department of Health & Human Services
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: 919-707-5950
FAX: 919-870-4808

AHERA (Asbestos Hazard Emergency Response Act)

NESHAP (97 counties)

NC Asbestos Hazard Management Program Rules

LOCAL AGENCIES REQUIRING NOTIFICATION

Three NC counties have been delegated authority by the US Environmental Protection Agency to enforce the NESHAP within their jurisdictions. The following agencies must be notified, in addition to the HHCU, of demolitions and asbestos removal projects occurring within their county:

Buncombe County
Western North Carolina Regional Air Pollution Control Agency
125 South Lexington Ave., Suite 101
Asheville, NC 28801
Telephone: 828-250-6777

Forsyth County
Environmental Assistance and Protection Department
201 N Chestnut Street
Winston-Salem, NC 27101
Telephone: 336-703-2440

Mecklenburg County
Land Use and Environmental Services Agency
Mecklenburg Air Quality
2145 Suttle Avenue
Charlotte, NC 28208
Telephone: 704-336-5430

North Carolina General Statutes
CHAPTER 130A
PUBLIC HEALTH.
ARTICLE 19.

Asbestos Hazard Management Program.

§ 130A-444. Definitions.

Unless a different meaning is required by the context, the following definitions apply throughout this Article:

(1) "AHERA" means Title II, Asbestos Hazard Emergency Response Act of the Toxic Substances Control Act, 15 U.S.C. § 2601, et seq., as amended by the Asbestos School Hazard Abatement Reauthorization Act of 1990, P.L. 101-637, 104 Stat. 4589 ("ASHARA").

(2) "Asbestos" means asbestiform varieties of chrysotile (serpentine), crocidolite (riebeckite), amosite (cummingtonite-grunerite), anthophyllite, tremolite and actinolite.

(3) "Asbestos containing material" means material which contains more than one percent (1%) asbestos, including friable asbestos containing material and nonfriable asbestos containing material.

(3a) "Asbestos NESHAP for demolition and renovation" means that portion of the National Emission Standards for Hazardous Air Pollutants for asbestos that governs demolition and renovation as set out in 40 CFR §§ 61.141, 61.145, 61.150, and 61.154 (1 July 1993 edition).

(4) "Abatement" means work performed to repair, maintain, remove, isolate, or encapsulate asbestos containing material. The term does not include inspections, preparation of management plans, abatement project design, taking of samples, or project overview.

(5) "Friable" means any material that when dry can be broken, crumbled, pulverized, or reduced to powder by hand pressure, and includes previously nonfriable material after such material becomes damaged to the extent that when dry it can be crumbled, pulverized, or reduced to powder by hand pressure.

(6) "Management" means all activities related to asbestos containing material, including inspections, preparation of management plans, abatement project design, abatement, project overview, and taking of samples.

(6a) "Person" means an individual, a corporation, a company, an association, a partnership, a unit of local government, a State or federal agency, or any other legal entity.

(7) "Public area" means those areas in any building other than a residence that are not covered under the Occupational Safety and Health Act of 1970, Pub. L. 91-596, 84 Stat. 1590, 29 U.S.C. § 651, et seq., as amended.

(8) "Removal" means stripping, chipping, sanding, sawing, drilling, scraping, sucking, and other methods of separating material from its installed location in a building.

(9) "Residence" means any single family dwelling or any multi-family dwelling of fewer than 10 units. (1989, c. 724, s. 1; 1993 (Reg. Sess., 1994), c. 686, s. 2; 1995, c. 123, s. 7.)

§ 130A-445. Management of asbestos containing material in schools.

All school buildings subject to the provisions of AHERA shall be inspected for asbestos containing materials and shall prepare and submit management plans to the Department. The Commission shall adopt rules governing school management plans. These rules shall specify the content and format of plans, the plan review and approval process, schedules and methods for implementation of approved plans, and periodic inspection requirements. (1989, c. 724, s. 1.)

§ 130A-446. Asbestos exposure standard for public areas.

The Commission shall adopt rules to establish a maximum airborne asbestos exposure level for public areas. Such rules shall also specify sampling and analysis procedures. (1989, c. 724, s. 1.)

§ 130A-447. Accreditation of persons performing asbestos management and approval of training courses.

(a) No person shall commence or continue to perform asbestos management activities unless he has been accredited by the Department. No person shall commence or continue to provide asbestos related training courses unless the course has been approved by the Department. The Commission shall adopt rules governing the accreditation of persons performing asbestos management activities and the approval of training courses. Such rules shall include categories of accreditation and shall specify appropriate education, experience, and training requirements. The rules shall establish separate categories of accreditation for inspectors, management planners, abatement designers, supervisors, workers, air monitors, and supervising air monitors. These rules shall be at least as stringent as the accreditation plan required under AHERA and regulations adopted pursuant thereto.

(b) A person who applies for accreditation in the worker category may engage in asbestos containing material management activities as though he were accredited in the worker category for up to 90 days after the date he submits his application. No person whose application is rejected may continue to engage in asbestos containing material management activities under this subsection.

(c) The following persons are exempt from the accreditation requirements:

(1) The owner or operator of a building, other than school buildings subject to the provisions of AHERA, and his permanent employees when performing small-scale, short duration activities, as defined in 40 C.F.R. Pt. 763, Subpt. E, Appendix C (1994).

(2) A person performing asbestos containing material management activities in his personal residence.

(3) Governmental regulatory personnel performing inspections of asbestos containing material management activities solely for the purpose of determining compliance with applicable statutes or regulations.

(4) Persons licensed by the General Contractors Licensing Board, State Board of Examiners of Plumbing and Heating Contractors, State Board of Examiners of Electrical Contractors, or the State Board of Refrigeration Examiners when engaged in activities associated with their license when performing small-scale, short duration activities, as defined in 40 C.F.R. Pt. 763, Subpt. E, Appendix C (1994). (1989, c. 724, s. 1; 1993 (Reg. Sess., 1994), c. 686, s. 3; 1995, c. 123, s. 8.)

§ 130A-448. Asbestos management accreditation fees and course approval fees.

(a) The Department shall establish and collect asbestos containing material management accreditation and annual renewal fees to support the asbestos hazard management program. The fees shall not exceed one hundred dollars ($100.00) per accreditation category, except that the fee for the abatement worker category shall not exceed twenty-five dollars ($25.00). A person who is accredited in more than one category shall pay a fee for each category.

(b) The Department shall establish and collect fees for approving asbestos management training courses and fees for renewing course approval annually to support the asbestos hazard management program. The fees for approving a training course shall not exceed one thousand five hundred dollars ($1,500) for each course. The annual renewal fees shall not exceed five hundred dollars ($500.00) for each course. Each category of a training course shall be subject to a separate fee for its initial approval and a separate fee for its annual renewal. (1989, c. 724, s. 1; 1993 (Reg. Sess., 1994), c. 686, s. 4.)

§ 130A-449. Asbestos containing material removal permits.

No person shall engage in asbestos abatement involving more than 35 cubic feet, 160 square feet, or 260 linear feet per job of asbestos containing material without an asbestos containing material removal permit issued by the Department. The Commission shall adopt rules governing such permits. Such rules may provide for exemption from the requirements of this section. (1989, c. 724, s. 1.)

§ 130A-450. Asbestos containing material removal permit fees.

The Department shall establish and collect an application fee for asbestos containing material removal permits to support the asbestos hazard management program. The fee shall not exceed one percent (1%) of the contracted price or twenty cents ($.20) per square foot or linear foot of asbestos containing material to be removed, whichever is greater. (1989, c. 724, s. 1.)

§ 130A-451. Commission to adopt rules.

For the protection of the public health, the Commission shall adopt rules to implement this Article, AHERA, and the asbestos NESHAP for renovations and demolitions. (1989, c. 724, s. 1; 1993 (Reg. Sess., 1994), c. 686, s. 5.)

§ 130A-452. Local air pollution control programs.

(a) The Department may authorize any local air pollution control program to adopt and enforce the asbestos NESHAP for demolition and renovation if the local air pollution control program is certified by the North Carolina Environmental Management Commission pursuant to G.S. 143-215.112. The Department shall authorize any local air pollution control program to adopt and enforce the asbestos NESHAP for demolition and renovation if the local air pollution control program was certified by the North Carolina Environmental Management Commission pursuant to G.S. 143-215.112 prior to October 1, 1994. A local air pollution control program shall continue to be authorized by the Department to enforce the asbestos NESHAP for demolition and renovation so long as the local air pollution control program maintains its certification under G.S. 143-215.112 and complies with any rules adopted by the Commission for Health Services pursuant to subsection (b) of this section. Any local air pollution control program authorized to adopt and enforce the asbestos NESHAP for demolition and renovation shall have the authority to enforce the asbestos NESHAP for demolition and renovation under G.S. 130A-18, 130A-22(b1), 130A-22(b2), and 130A-25. Judicial review of an administrative penalty assessed under G.S. 130-22(b1) and G.S. 130A-22(b2) shall be as provided in G.S. 143-215.112(d2)(1) and Article 4 of Chapter 150B of the General Statutes.

(b) The Commission for Health Services shall adopt rules regarding the authorization of local air pollution control programs to enforce the asbestos NESHAP for demolition and renovation. (1993 (Reg. Sess., 1994), c. 686, s. 7; 1995, c. 123, s. 6.)

§ 130A-453. Reserved for future codification purposes.

Source: North Carolina General Statutes
April 1, 2005

§ 130A-22. Administrative penalties.

(a) The Secretary of Environmental Quality may impose an administrative penalty on a person who violates Article 9 of this Chapter, rules adopted by the Environmental Management Commission pursuant to Article 9, or any term or condition of a permit or order issued under Article 9. Each day of a continuing violation shall constitute a separate violation. The penalty shall not exceed fifteen thousand dollars ($15,000) per day in the case of a violation involving nonhazardous waste. The penalty shall not exceed thirty-two thousand five hundred dollars ($32,500) per day in the case of a first violation involving hazardous waste as defined in G.S. 130A-290 or involving the disposal of medical waste as defined in G.S. 130A-290 in or upon water in a manner that results in medical waste entering waters or lands of the State; and shall not exceed fifty thousand dollars ($50,000) per day for a second or further violation involving the disposal of medical waste as defined in G.S. 130A-290 in or upon water in a manner that results in medical waste entering waters or lands of the State. The penalty shall not exceed thirty-two thousand five hundred dollars ($32,500) per day for a violation involving a voluntary remedial action implemented pursuant to G.S. 130A-310.9(c) or a violation of the rules adopted pursuant to G.S. 130A-310.12(b). For violations of Part 7 of Article 9 of this Chapter and G.S. 130A-309.10(m): (i) a warning shall be issued for a first violation; (ii) the penalty shall not exceed two hundred dollars ($200.00) for a second violation; and (iii) the penalty shall not exceed five hundred dollars ($500.00) for subsequent violations. If a person fails to pay a civil penalty within 60 days after the final agency decision or court order has been served on the violator, the Secretary of Environmental Quality shall request the Attorney General to institute a civil action in the superior court of any county in which the violator resides or has his or its principal place of business to recover the amount of the assessment. Such civil actions must be filed within three years of the date the final agency decision or court order was served on the violator.

(a1) Part 5 of Article 21A of Chapter 143 of the General Statutes shall apply to the determination of civil liability or penalty pursuant to subsection (a) of this section.

(b) The Secretary of Environmental Quality may impose an administrative penalty on a person who violates G.S. 130A-325. Each day of a continuing violation shall constitute a separate violation. The penalty shall not exceed twenty-five thousand dollars ($25,000) for each day the violation continues.

(b1) The Secretary may impose an administrative penalty on a person who violates Article 19 of this Chapter or a rule adopted pursuant to that Article. Except as provided in subsection (b2) of this section, the penalty shall not exceed one thousand dollars ($1,000) per day per violation. Until the Department has notified the person of the violation, a continuing violation shall be treated as one violation. Each day thereafter of a continuing violation shall be treated as a separate violation.

In determining the amount of a penalty under this subsection or subsection (b2) of this section, the Secretary shall consider all of the following factors:

(1) The degree and extent of harm to the natural resources of the State, to the public health, or to private property resulting from the violation.
(2) The duration and gravity of the violation.
(3) The effect on air quality.
(4) The cost of rectifying the damage.
(5) The amount of money the violator saved by noncompliance.
(6) The prior record of the violator in complying or failing to comply with Article 19 of this Chapter or a rule adopted pursuant to that Article.
(7) The cost to the State of the enforcement procedures.
(8) If applicable, the size of the renovation and demolition involved in the violation.

(b2) The penalty for violations of the asbestos NESHAP for demolition and renovation, as defined in G.S. 130A-444, shall not exceed ten thousand dollars ($10,000) per day per violation. Until the Department has provided the person with written notification of the violation of the asbestos NESHAP for demolition and renovation that describes the violation, recommends a general course of action, and establishes a time frame in which to correct the violations, a continuing violation shall be treated as one violation. Each day thereafter of a continuing violation shall be treated as a separate violation. A violation of the asbestos NESHAP for demolition and renovation is not considered to continue during the period a person who has received the notice of violation is following the general course of action and complying with the time frame set forth in the notice of violation.

(b3) The Secretary may impose an administrative penalty on a person who violates Article 19A or 19B of this Chapter or any rules adopted pursuant to Article 19A or 19B of this Chapter. Each day of a continuing violation is a separate violation. The penalty shall not exceed five thousand dollars ($5,000) for each day the violation

continues for Article 19A of this Chapter. The penalty shall not exceed five thousand dollars ($5,000) for each day the violation continues for Article 19B of this Chapter. The penalty authorized by this section does not apply to a person who is not required to be certified under Article 19A or 19B.

(c) The Secretary may impose an administrative penalty on a person who willfully violates Article 11 of this Chapter, rules adopted by the Commission pursuant to Article 11 or any condition imposed upon a permit issued under Article 11. An administrative penalty may not be imposed upon a person who establishes that neither the site nor the system may be improved or a new system installed so as to comply with Article 11 of this Chapter. Each day of a continuing violation shall constitute a separate violation. The penalty shall not exceed fifty dollars ($50.00) per day in the case of a wastewater collection, treatment and disposal system with a design daily flow of no more than 480 gallons or in the case of any system serving a single one-family dwelling. The penalty shall not exceed three hundred dollars ($300.00) per day in the case of a wastewater collection, treatment and disposal system with a design daily flow of more than 480 gallons which does not serve a single one-family dwelling.

(c1) The Secretary may impose a monetary penalty on a vendor who violates rules adopted by the Commission pursuant to Article 13 of this Chapter when the Secretary determines that disqualification would result in hardship to participants in the Women, Infants, and Children (WIC) program. The penalty shall be calculated using the following formula: multiply five percent (5%) times the average dollar amount of the vendor's monthly redemptions of WIC food instruments for the 12-month period immediately preceding disqualification, then multiply that product by the number of months of the disqualification period determined by the Secretary.

(d) In determining the amount of the penalty in subsections (a), (b) and (c), the Secretary and the Secretary of Environmental Quality shall consider all of the following factors:

(1) Type of violation.
(2) Type of waste involved.
(3) Duration of the violation.
(4) Cause (whether resulting from a negligent, reckless, or intentional act or omission).
(5) Potential effect on public health and the environment.
(6) Effectiveness of responsive measures taken by the violator.
(7) Damage to private property.
(8) The degree and extent of harm caused by the violation.
(9) Cost of rectifying any damage.
(10) The amount of money the violator saved by noncompliance.
(11) The violator's previous record in complying or not complying with the provisions of Article 9 of this Chapter, Article 11 of this Chapter, or G.S. 130A-325, and any regulations adopted thereunder, as applicable to the violation in question.

(e) A person contesting a penalty shall, by filing a petition pursuant to G.S. 150B-23(a) not later than 30 days after receipt by the petitioner of the document which constitutes agency action, be entitled to an administrative hearing and judicial review in accordance with Chapter 150B of the General Statutes, the Administrative Procedure Act.

(f) The Commission shall adopt rules concerning the imposition of administrative penalties pursuant to this section that are under authority of the Secretary, and the Environmental Management Commission shall adopt rules concerning the imposition of administrative penalties pursuant to this section that are under authority of the Secretary of Environmental Quality.

(g) The Secretary or the Secretary of Environmental Quality may bring a civil action in the superior court of the county where the violation occurred or where the defendant resides to recover the amount of an administrative penalty authorized under this section whenever a person:

(1) Who has not requested an administrative hearing in accordance with subsection (e) of this section fails to pay the penalty within 60 days after being notified of the penalty; or
(2) Who has requested an administrative hearing fails to pay the penalty within 60 days after service of a written copy of the final agency decision.

(h) A local health director may impose an administrative penalty on any person who willfully violates the wastewater collection, treatment, and disposal rules of the local board of health adopted pursuant to G.S. 130A-335(c) or who willfully violates a condition imposed upon a permit issued under the approved local rules. An administrative penalty may not be imposed upon a person who establishes that neither the site nor the system may be improved or a new system installed so as to comply with Article 11 of this Chapter. The local health

director shall establish and recover the amount of the administrative penalty in accordance with subsections (d) and (g). Each day of a continuing violation shall constitute a separate violation. The penalty shall not exceed fifty dollars ($50.00) per day in the case of a wastewater collection, treatment and disposal system with a design daily flow of no more than 480 gallons or in the case of any system serving a single one-family dwelling.
The penalty shall not exceed three hundred dollars ($300.00) per day in the case of a wastewater collection, treatment and disposal system with a design daily flow of more than 480 gallons which does not serve a single one-family dwelling. A person contesting a penalty imposed under this subsection shall be entitled to an administrative hearing and judicial review in accordance with G.S. 130A-24. A local board of health shall adopt rules concerning the imposition of administrative penalties under this subsection.

(h1) A local health director may take the following actions and may impose the following administrative penalty on a person who manages, operates, or controls a public place or place of employment and fails to comply with the provisions of Part 1C of Article 23 of this Chapter or with rules adopted thereunder or with local ordinances, rules, laws, or policies adopted pursuant to Part 2 of Article 23 of this Chapter:

(1) First violation. - Provide the person in violation with written notice of the person's first violation and notification of action to be taken in the event of subsequent violations.
(2) Second violation. - Provide the person in violation with written notice of the person's second violation and notification of administrative penalties to be imposed for subsequent violations.
(3) Subsequent violations. - Impose on the person in violation an administrative penalty of not more than two hundred dollars ($200.00) for the third and subsequent violations.

Each day on which a violation of this Article or rules adopted pursuant to this Article occurs may be considered a separate and distinct violation. Notwithstanding G.S. 130A-25, a violation of Article 23 of this Chapter shall not be punishable as a criminal violation.

(i) The clear proceeds of penalties assessed pursuant to this section shall be remitted to the Civil Penalty and Forfeiture Fund in accordance with G.S. 115C-457.2.

(j) The Secretary of Environmental Quality may also assess the reasonable costs of any investigation, inspection, or monitoring associated with the assessment of the civil penalty against any person who is assessed a civil penalty under this section. (1983, c. 891, s. 2; 1987, c. 269, s. 2; c. 656; c. 704, s. 1; c. 827, s. 247; 1989, c. 742, s. 4; 1991, c. 691, s. 1; c. 725, s. 8; 1991 (Reg. Sess., 1992), c. 944, s. 11; 1993 (Reg. Sess., 1994), c. 686, s. 1; 1995, c. 504, s. 8; 1997-443, s. 11A.64; 1997-523, s. 2; 1998-215, s. 54(a); 2001-474, s. 21; 2002-154, s. 1; 2007-550, ss. 3(a), 4(a); 2009-27, s. 2; 2009-163, s. 2; 2009-488, s. 2; 2010-180, s. 14(c); 2011-145, s. 13.3(xx); 2013-378, s. 7; 2013-413, s. 49; 2015-241, s. 14.30(v); 2017-209, s. 19(b); 2020-74, s. 12(b).)

SECTION .0600 - ASBESTOS HAZARD MANAGEMENT PROGRAM

10A NCAC 41C .0601 GENERAL

(a) The definitions contained in G.S. 130A-444 and the following definitions shall apply throughout this Section:

(1) "Abatement Designer" means a person who is responsible for planning all phases of an asbestos abatement design from abatement site preparation through disassembly of all abatement area barriers and who meets the requirements of Rule .0602(c) of this Section.

(2) "Abatement Project Monitoring Plan" means a written project-specific plan for conducting visual inspections and ambient and clearance air sampling.

(3) "Air Monitor" means a person who implements the abatement project monitoring plan, collects ambient and clearance air samples, performs visual inspections, or monitors and evaluates asbestos abatement, and who meets the requirements of Rule .0602(c) of this Section.

(4) "Asbestos Abatement Design" means a written or graphic plan that is prepared by an accredited abatement designer as defined in Subparagraph (a)(1) of this Rule and that specifies how an asbestos abatement project will be performed. An asbestos abatement design shall include, at minimum, the following:

(A) a scope of work and technical specifications;

(B) the asbestos abatement designer's signature; and

(C) the accreditation number.

(5) "Completion Date" means the date on which all activities on a permitted asbestos removal requiring the use of accredited workers and supervisors are complete, including the disassembly of all removal area barriers.

(6) "Emergency Renovation Operation" means the same as defined in 40 CFR Part 61.141 and as adopted in Rule .0609 of this Section.

(7) "Inspector" means a person who examines buildings or structures for the presence of asbestos containing materials, collects bulk samples, or conducts physical assessments of the asbestos containing materials, and who meets the requirements of Rule .0602(c) of this Section. A person whose asbestos inspection activities are limited to roofing products is not considered an inspector under this definition if the person is accredited as a roofing supervisor under this Section.

(8) "Installation" means any building or structure or group of buildings or structures at a single site under the control of the same owner or operator.

(9) "Management Planner" means a person who interprets inspection reports, conducts hazard assessments of asbestos containing materials, and prepares written management plans, and who meets the requirements of Rule .0602(c) of this Section.

(10) "Nonscheduled Asbestos Removal" means the same as nonscheduled renovation operation, as defined in 40 CFR Part 61.141, of asbestos containing material.

(11) "Program" means the Health Hazards Control Unit within the Division of Public Health.

(12) "Public Area" means as defined in G.S. 130A-444(7).

(13) "Regulated Asbestos Containing Material" means the same as defined in 40 CFR Part 61.141 and as adopted in Rule .0609 of this Section.

(14) "Start Date" means the date on which activities begin on an asbestos removal project that is permitted pursuant to Rule .0605 of this Section and that requires the use of workers and supervisors who are accredited pursuant to Rule .0602 of this Section, including removal area isolation and preparation or any other activity which may disturb asbestos containing materials. (15) "Successfully complete" means that an individual has attended the initial or refresher training course and passed the course exam with a score of 70 percent or higher in accordance with Rules .0603 and .0611 of this Section and 40 C.F.R. Part 763, Subpart E, Appendix C(I)(C)(2).

(16) "Supervising Air Monitor" means a person who meets the requirements of Rule .0602(c) of this Section and who prepares a written abatement project monitoring plan and implements the plan or

ensures that the plan is implemented by an air monitor working under his or her supervision. The supervising air monitor directs, coordinates, and approves all activities of air monitors working under his or her supervision. The supervising air monitor may also perform the duties of an air monitor.

(17) "Supervisor" means a person who is a "competent person" as defined in 29 CFR 1926.1101(b) and who is an "on-site representative" as defined in 40 CFR Part 61.145(c)(8) as adopted in Rule .0609 of this Section and who performs the duties specified therein.

(18) "Under the direct supervision" means working under the guidance of an individual who is accredited pursuant to Rule .0602 of this Section and who is responsible for all activities performed.

(19) "Worker" means a person who performs asbestos abatement under the direct supervision of an accredited supervisor.

(20) "Working day" means Monday through Friday, including any holidays.

(21) "Class II Asbestos Work" means as defined in 29 CFR 1926.1101(b).

(22) "Roofing Worker" means a person whose duties regarding asbestos are limited to Class II asbestos work involving the removal of roofing products that are classified as regulated asbestos containing material and who works under the direct supervision of a roofing supervisor.

(23) "Roofing Supervisor" means a supervisor as defined in Subparagraph (a)(16) of this Rule, whose duties regarding asbestos are limited to Class II asbestos work involving only roofing products that are classified as regulated asbestos containing material. This person may also perform asbestos roofing inspection activities which are limited to roofing products, including the collection of bulk samples.

(24) "Roofing Products" means bituminous built-up roofing systems, roofing membranes, asphalt shingles, cement shingles, roofing cements, mastics, coatings, panels, light weight roofing concrete, and flashings.

(b) In addition to the rules of this Section, asbestos management activities shall comply with the Asbestos Hazard Emergency Response Act (AHERA) as defined at G.S. 130A-444(1) and 40 CFR Part 763, Subpart E and Appendices, which are hereby incorporated by reference, including any subsequent amendments and editions, and available free of charge at: https://www.ecfr.gov/.

(c) For the purposes of this Section, 29 CFR 1926.1101 is hereby incorporated by reference, including any subsequent amendments and editions, and available free of charge at https://www.ecfr.gov/.

History Note: *Authority G.S. 130A 5(3); 130A 451;*
Temporary Amendment Eff. November 8, 1994 for a period of 180 days or until the permanent rule becomes effective, whichever is sooner;
Temporary Amendment Eff. November 1, 1989 for a period of 180 days to expire on April 30, 1990;
Temporary Rule Eff. October 28, 1988 for a period of 180 days to expire on April 26, 1989;
Eff. March 1, 1989;
Amended Eff. July 1, 1996; January 1, 1995; October 1, 1994; August 1, 1991; February 1, 1990;
Readopted Eff. January 1, 2021.

10A NCAC 41C .0602 ACCREDITATION

(a) No person shall perform asbestos management activities until that person has been accredited by the Program in the appropriate accreditation category, as set forth in Paragraphs (b) and (c) of this Rule, except as provided for in G.S. 130A-447(b) and (c).

(b) An applicant for accreditation shall meet the requirements of the "EPA Model Contractor Accreditation Plan" contained in 40 CFR Part 763, Subpart E, Appendix C and shall complete the applicable training courses approved by the Program pursuant to Rule .0603 of this Section and as set forth in this Rule for each accreditation category. An applicant applying for roofing worker or roofing supervisor accreditation shall only be required to complete the training courses as described under Rule .0611 of this Section.

(c) In addition to the requirements in Paragraph (b) of this Rule, an applicant, other than for the worker or roofing worker categories, shall meet the following:

(1) an applicant for initial accreditation shall have completed an approved initial training course for the discipline in which the applicant seeks accreditation within the 12 months immediately preceding application. If initial training was completed more than 12 months prior to application, the applicant shall have completed an approved refresher training course for the discipline in which he or she seeks accreditation at least every 24 months from the date of completion of initial training to the date of application;

(2) an inspector shall have:
- (A) a high school diploma or equivalent; and
- (B) at least three months of experience working as an accredited asbestos inspector or three months of experience working under the direct supervision of an accredited inspector.

(3) a management planner shall have a high school diploma or equivalent and shall be an accredited inspector, as defined in Subparagraph (c)(2) of this Rule.

(4) a supervisor or roofing supervisor shall have:
- (A) a high school diploma or equivalent; except that this requirement shall not apply to supervisors that were accredited on November 1, 1989, or roofing supervisors that were accredited prior to April 1, 1997; and
- (B) at least three months of experience working as an accredited asbestos supervisor or three months of experience working under the direct supervision of an accredited supervisor.

(5) an abatement designer shall have:
- (A) a high school diploma or equivalent; and
- (B) at least three months of experience working as an accredited asbestos designer or three months of experience working under the direct supervision of an accredited abatement designer.

(6) an air monitor shall work only under an accredited supervising air monitor or meet the provisions of Part (c)(7)(C) of this Rule. However, this requirement shall not apply to the owner or operator of a building and his employees when performing air monitoring in non-public areas. In addition, all air monitors shall meet the following requirements:
- (A) Education and Work Experience:
  - (i) a high school diploma or equivalent; and
  - (ii) at least three months of experience working as an asbestos air monitor or three months of experience working under the direct supervision of an accredited air monitor.
- (B) Training Requirements:
  - (i) complete a Program approved National Institute for Occupational Safety and Health (NIOSH) 582 or Program approved NIOSH 582 Equivalency Course and meet the initial and refresher training requirements of this Rule for supervisors; Program approved project monitor refresher course may be substituted for the supervisor refresher course; or
  - (ii) meet the initial and refresher training requirements of this Rule for a Program approved five-day project monitor course and a Program approved annual refresher course.

(7) a supervising air monitor shall meet the following requirements:
- (A) Education and Work Experience:
  - (i) a high school diploma or equivalent;

(ii) at least three months of experience working as an asbestos air monitor or three months of experience working under the direct supervision of an accredited air monitor.

(B) Training Requirements:

(i) complete a Program approved NIOSH 582 or Program approved NIOSH 582 Equivalency Course and meet the initial and refresher training requirements of this Rule for supervisors; a Program approved project monitor refresher course may be substituted for the supervisor refresher course; or

(ii) meet the initial and refresher training requirements of this Rule for a Program approved five-day project monitor course and a Program approved annual refresher course.

(C) Professional Status:

(i) a supervising air monitor who was accredited as an air monitor on or after February 1, 1991, or an air monitor accredited prior to that date who has not continuously maintained accreditation, shall be a Certified Industrial Hygienist;

(ii) a supervising air monitor who was accredited as an air monitor prior to February 1, 1991, who has continuously maintained accreditation shall be a Certified Industrial Hygienist, Professional Engineer, or Registered Architect.

(D) Air monitors with a valid accreditation on January 1, 1995 supervising other accredited air monitors shall be deemed to be accredited supervising air monitors for the duration of their existing air monitor accreditation.

(d) To obtain accreditation, the applicant shall submit to the Program:

(1) a completed application on a form provided by the Program, which is available at: https://epi.dph.ncdhhs.gov/asbestos/healthaz.html. A completed application form shall include the following information:

(A) full name;
(B) address, including city, state, zip code, and telephone number;
(C) date of birth, sex, height, and weight;
(D) discipline applied for;
(E) name, address, and telephone number of employer;
(F) training agency attended;
(G) name of training course completed; and
(H) dates of course attended;

(2) one 1.25 inch x 1.25 inch color photograph of the applicant taken within the preceding six months per application with the applicant's full name printed on the back of each photograph;

(3) confirmation of completion of an approved initial or refresher training course from the training agency. The confirmation shall be in the form of an original certificate of completion of the approved training course bearing the training agency's official seal or an original letter from the training agency on training agency letterhead that includes the following information:

(A) the name of the course completed;
(B) the date of course completion;
(C) the unique certificate number; and
(D) a list of names for the individuals who successfully completed the training course, with the applicant's name included in that list;

(4) when education is a requirement in accordance with this Rule, a copy of the diploma;

(5) when work experience is a requirement in accordance with this Rule, documentation of the applicant's asbestos related work experience that includes the following:

(A) employer name;
(B) employer address and phone number;
(C) position(s) held by applicant; and
(D) dates when the applicant held each position;

(6) when applicants for initial air monitor accreditation are working under an accredited supervising air monitor pursuant to Subparagraph (c)(6) of this Rule, the accredited supervising air monitor shall submit an original, signed letter acknowledging responsibility for the applicant's air monitoring activities. The applicant shall ensure that a new letter is submitted to the Program any time the information in the letter currently on file is no longer accurate.

(e) All accreditations shall expire at the end of the 12th month following completion of required initial or refresher training. Work performed after the 12th month and prior to reaccreditation shall constitute a violation of this Rule. To be reaccredited, an applicant shall have completed the required refresher training course within 24 months after the initial or refresher training course. An applicant for reaccreditation shall also submit information specified in Subparagraphs (d)(1)-(d)(6) of this Rule. If a person fails to obtain the required training within 12 calendar months after the expiration date of accreditation, that person shall be accredited only by meeting the requirements of Paragraphs (b), (c), and (d) of this Rule.
(f) All accredited persons shall be assigned an accreditation number and issued a photo-identification card by the Program.
(g) In accordance with G.S. 130A-23, the Program may revoke accreditation or reaccreditation for any violation of G.S. 130A, Article 19 or the rules in this Section, or upon determining that its issuance was based upon incorrect or inadequate information that materially affected the decision to issue accreditation or reaccreditation. The Program shall also revoke accreditation or reaccreditation upon a finding that the accredited person has violated any requirement referenced in Rule .0605(e) of this Section. A person whose accreditation is revoked because of fraudulent misrepresentations or because of violations that create a public health hazard shall not reapply for accreditation before six months after the revocation and shall repeat the initial training course and other requirements as set out in Paragraphs (b), (c), and (d) of this Rule.

History Note: *Authority G.S. 130A-5(3); 130A-23; 130A-447;*
Temporary Rule Eff. October 28, 1988 for a period of 180 days to expire on April 26, 1989;
Eff. March 1, 1989;
Temporary Amendment Eff. November 1, 1989 for a period of 180 days to expire on April 30, 1990;
Amended Eff. October 1, 1994; August 1, 1991; February 1, 1990;
Temporary Amendment Eff. November 8, 1994 for a period of 180 days or until the permanent rule becomes effective, whichever is sooner;
Amended Eff. July 1, 1996; January 1, 1995;
Readopted Eff. January 1, 2021.

10A NCAC 41C .0603 APPROVAL OF TRAINING COURSES

(a) Pursuant to Rule .0602 of this Section, applicants for accreditation and reaccreditation are required to successfully complete training courses approved by the Program. Training courses:

(1) Required or recommended by 40 CFR Part 763, Subpart E, Appendix C and approved for a specific training provider by the Environmental Protection Agency or by a state with an Environmental Protection Agency-approved accreditation program, or by a state that has a written reciprocating agreement with the Program and meeting the requirements under Paragraph (g) of this Rule shall be deemed approved by the Program unless approval is suspended or revoked in accordance with Paragraph (I) of this Rule;

(2) Required or recommended under 40 CFR Part 763, Subpart E, Appendix C and having no prior Program approval as specified in Subparagraph (a)(1) of this Rule shall meet the requirements of 40 CFR Part 763, Subpart E, Appendix C, I and III, and this Rule; or

(3) Other than those covered in Subparagraphs (1) and (2) of this Paragraph which are required for North Carolina accreditation purposes shall meet the requirements of this Rule. Roofing worker or roofing supervisor courses taught prior to the effective date of these Rules and after August 10, 1994, that met the requirements of Rule .0611 of this Section shall be considered acceptable for accreditation purposes.

(b) Refresher training courses shall review and discuss changes in the Federal and State regulations, developments in the state-of-the-art procedures, and key aspects of the initial courses outlined under 40 CFR Part 763, Subpart E, Appendix C or Rule .0611 of this Section, as applicable.

(c) At the completion of the refresher training courses in all disciplines, the training provider shall administer a written closed book examination, approved by the Program. The requirements for the examination shall consist of a minimum of 25 multiple choice questions. For successful completion of the course the applicant shall pass the exam with a minimum score of 70 percent.

(d) Training courses shall be evaluated to maintain approval by the Program for course administration, course length, curriculum, training methods, instructors' qualifications, instructors' teaching effectiveness, technical accuracy of written materials and instruction, examination, and training certificate. The evaluation shall be conducted using 40 CFR Part 763, Subpart E, Appendix C, Rules .0608 and .0611 of this Section, or NIOSH 582 curriculum, as applicable, which are hereby incorporated by reference, including any subsequent amendments and editions. These documents are available for inspection at the Division of Public Health, 1915 Mail Service Center, Raleigh, North Carolina 27699-1915. Copies of 40 CFR Part 763, Subpart E, Appendix C may be obtained by writing to the Superintendent of Documents, Government Printing Office, P.O. Box 371954, Pittsburgh, PA 15250-7954, at a cost of twenty-six dollars ($26.00). Copies of the NIOSH 582 curriculum may be obtained by writing the Division of Public Health, 1915 Mail Service Center, Raleigh, North Carolina 27699-1915 at a cost of thirty-five dollars ($35.00).

(e) Training course providers shall submit the following for evaluation and approval by the Program:

(1) a completed application on a form provided by the Program, along with supporting documentation. The form and supporting documentation shall include the following:

(A) name, address, and telephone number of the training provider, and name and signature of the contact person;

(B) course title, location and the language in which the course is to be taught;

(C) a student manual and an instructor manual for each course and a content checklist that identifies and locates sections of the manual where required topics are covered;

(D) course agenda;

(E) a copy or description of all audio/visual materials used;

(F) a description of each hands-on training activity;

(G) a copy of a sample exam;

(H) a sample certificate with the following information; and

(i) Name and social security number of student;

(ii) Training course title specifying initial or refresher;

(iii) Inclusive dates of course and applicable examination;

(iv) Statement that the student completed the course and passed any examination required;

(v) Unique certificate number as required;

(vi) For courses covered under 40 CFR Part 763, Subpart E, Appendix C, certificate expiration date that is one year after the date the course was completed and the applicable examination passed;

(vii) Printed name and signature of the training course administrator and printed name of the principal instructor;

(viii) Name, address, and phone number of the training provider;

(ix) Training course location;

(x) For courses required under 40 CFR Part 763, Subpart E, Appendix C, a statement that the person receiving the certificate has completed the requisite training for asbestos accreditation under Title II of the Toxic Substances Control Act; and

(xi) For training courses taught in languages other than English, the certificate shall indicate the language of the course.

(I) a list of training currently being provided.

(2) A list of instructors and their qualifications in accordance with Rule .0608 of this Section.

(f) An application for course approval shall be processed as follows:

(1) The Program shall review the application and supporting documentation submitted pursuant to Paragraph (e) of this Rule and advise the applicant of any deficiencies;

(2) If the submitted documentation meets all applicable requirements of this Rule, the Program shall notify the applicant of this and also advise the applicant that it may contact the Program to schedule an on-site audit; of a training course taught in North Carolina; approval of submitted documentation does not constitute course approval;

(3) If the Program determines, as a result of the audit, that the training course meets all applicable requirements of this Rule, it shall issue course approval. If the course does not meet these requirements, the Program shall notify the applicant of the deficiencies and advise that applicant that it may request one additional audit, which shall be held no more than six months from the date of the first audit; a request for audit after that time shall require a new application and fee;

(4) If the Program determines, as the result of the second audit, that the training course meets all applicable requirements of this Rule, it shall issue course approval. If the course does not meet all these requirements, the Program shall notify the applicant of the deficiencies and advise the applicant that it may not reapply for course approval for the audited course for a period of six months from the date of the last audit;

(5) The Program shall not accept certificates pursuant to Rule .0602 of this Section for a training course that is not approved or deemed approved pursuant to this Rule.

(g) Training course providers shall perform the following in order to maintain approval of all initial and refresher courses:

(1) Issue a certificate of training meeting the requirements of Part (e)(1)(H) of this Rule to any student who completes the required training and passes the applicable examination.

(2) Submit to the Program written notice of intention to conduct a training course for North Carolina asbestos accreditation purposes if the course is to be taught in North Carolina or if requested by the Program. Notices for training courses, except asbestos worker, shall be postmarked or received 10 working days before the training course begins. Notices for asbestos worker training courses shall be postmarked or received five working days before the training course begins. If the training course is canceled, the training course provider shall notify the Program at least one working day prior to the scheduled start date. Notification of intent to conduct a training course shall be made using a form provided by the Program and shall include the following:

(A) Training provider name, address, phone number and contact person;

(B) Training course title;

(C) Inclusive dates of course and applicable exam;

(D) Start and completion times;

(E) Identify whether the course is public offering, contract training, or for the training provider's employees;

(F) Location and directions to course facility;

(G) Language in which the course is taught; and

(H) Principal instructor.

(3) Notify the Program, in writing, at least 10 working days prior to the scheduled course start date, of any changes to course length, curriculum, training methods, training manual or materials, instructors, examination, training certificate, training course administrator or contact person. The changes must be approved by the Program in order for the course to be acceptable for accreditation purposes.

(4) Submit to the Program information and documentation for any course approved under Subparagraph (a) of this Rule if requested by the Program.

(5) Ensure that all instructors meet the requirements of Rule .0608 of this Section and are approved by the Program.

(6) Ensure that all training courses covered under this Rule meet the following requirements:

(A) All initial training courses shall have a maximum of 40 students;

(B) A day of training shall include at least six and one-half hours of direct instruction, including classroom, hands-on training or field trips;

(C) Regular employment and instruction time shall not exceed 12 hours in a 24 hour period;

(D) A training course shall be completed within a two-week period;

(E) All instructors and students shall be fluent in the language in which the course is being taught;

(F) An interpreter shall not be used;

(G) Upgrading worker accreditation to that of supervisor by completing only one day of initial training is not permitted. Separate initial training as a supervisor is required;

(H) A single instructor is allowed only for a worker course. Other initial disciplines shall have a minimum of two instructors;

(I) Instructor ratio for hands-on shall be no more than 10 students per instructor;

(J) All course materials shall be in the language in which the course is being taught;

(K) Each training course required by 40 CFR Part 763, Subpart E, Appendix C, shall be discipline specific;

(L) Students shall be allowed to take an examination no more than twice for each course. After two failures, the student shall retake the full course before being allowed to retest; and

(M) Training providers shall provide examination security to prevent student access to the examination materials before and after the exam. Training providers shall take measures to preclude cheating during the exam, such as providing space between students, prohibiting talking, and monitoring students throughout the exam.

(7) Verify, by photo identification, the identity of any student requesting training.

(8) For each course approved or deemed approved by the Program under Paragraph (a) of this Rule and taught in North Carolina, the training provider shall submit a completed renewal application on a form provided by the Program. Effective January 1, 1995, a renewal application shall be submitted prior to the next course offering and annually thereafter. If an annual training course renewal lapses, the provider shall submit a renewal application prior to offering the course again in North Carolina. Training courses approved by the Program under Paragraph (f) of this Rule shall be taught at least once every three years in North Carolina.

(9) Training courses required or recommended under 40 CFR Part 763, Subpart E, Appendix C, shall meet the requirements therein.

(10) Work practice and worker protection demonstrations and hands-on exercises, including, but not limited to respirator fit testing, presented in all training courses covered under this Rule shall be conducted following the procedures provided in 29 CFR 1926.1101 which is incorporated by reference in Rule .0601(c) of this Section.

(h) Training course providers shall permit Program representatives to attend, evaluate and monitor any training course, take the course examination and have access to records of training courses without charge or hindrance to the Program for the purpose of evaluating compliance with 40 CFR Part 763, Subpart E, Appendix C and these Rules. The Program shall perform periodic and unannounced on-site audits of training courses.

(i) In accordance with G.S. 130A-23, the Program may revoke approval for a training course for violation of this Rule and shall revoke approval upon revocation of approval by the Environmental Protection Agency or by any state with an Environmental Protection Agency-approved accreditation program. A training provider whose approval has been revoked by the Program shall not be eligible for reapproval for a period of one year from the date of revocation. The Program shall also revoke course approval for all courses taught by a training provider upon a

finding that the training course provider has issued one or more certificates to an individual who did not actually attend the course, either initial or refresher, and pass the examination. When course approval is revoked for improper issuance of certificates, the training course provider shall not be eligible for reapproval for a period of three years from the date of revocation.

History Note: *Authority G.S. 130A-5(3); 130A-447; P.L. 99-519;*
Temporary Rule Eff. November 1, 1989 for a period of 180 days to expire on April 30, 1989;
Eff. February 1, 1990;
Amended Eff. October 1, 1994; August 1, 1991;
Temporary Amendment Eff. November 8, 1994 for a period of 180 days or until the permanent rule becomes effective, whichever is sooner;
Amended Eff. July 1, 1996; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. February 16, 2019.

10A NCAC 41C .0604 ASBESTOS MANAGEMENT PLANS

(a) All Local Education Agencies as defined in 40 CFR Part 763, Subpart E shall submit Asbestos Management Plans for school buildings to the Program on forms provided by the Program. Asbestos Management Plans shall meet the requirements contained in 40 CFR Part 763, Subpart E.

(b) In addition to the requirements in Paragraph (a) of this Rule, the management plan shall identify, locate, classify, quantify, and assess asbestos containing building materials.

(c) All Local Education Agencies shall submit to the Program, within 120 days of the actual on-site reinspection, the Asbestos Hazard Emergency Response Act reinspection reports as required under 40 CFR Part 763, Subpart E. These reports shall be submitted on forms provided by the Program.

(d) All inspectors and management planners developing management plans and reinspection reports under the Asbestos Hazard Emergency Response Act shall comply with all requirements of 40 CFR Part 763, Subpart E and the rules of this Section.

History Note: *Authority G.S. 130A-5(3); 130A-445; P.L. 99-519;*
Temporary Rule Eff. November 1, 1989 for a period of 180 days to expire on April 30, 1990;
Eff. February 1, 1990;
Amended Eff. October 1, 1994; August 1, 1991;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. February 16, 2019.

10A NCAC 41C .0605 ASBESTOS CONTAINING MATERIALS REMOVAL PERMITS

(a) No person shall remove more than 35 cubic feet (1 cubic meter), 160 square feet (15 square meters) or 260 linear feet (80 linear meters) of regulated asbestos containing material, without a permit issued by the Program. This permitting requirement is applicable to:

(1) individual removals that exceed the threshold amounts addressed in this Paragraph;

(2) nonscheduled asbestos removals conducted at an installation that exceed the threshold amounts addressed in this Paragraph in a calendar year of January 1 through December 31. Other asbestos abatement activities are exempt from the permit requirements of G.S. 130A-449.

(b) All applications shall be made on a form provided or approved by the Program. The application submittal shall include at least all of the information specified under the notification requirements of 40 CFR Part 61.145(b), Subpart M as adopted in Rule .0609 of this Section. Applications for asbestos containing material removal permits shall adhere to the following schedule.

(1) Applications for individual asbestos removals shall be postmarked or received by the Program at least 10 working days prior to the scheduled removal start date. For emergency renovation operations involving asbestos removal, the 10 working days notice shall be waived. An application for a permit for the emergency renovation operation shall be postmarked or received by the Program as early as possible before, but not later than, the following working day. Permit applications for emergency renovation operations shall be accompanied by a letter from the owner or his representative explaining the cause of the emergency;

(2) Applications for nonscheduled asbestos removals shall be postmarked or received by the Program at least 10 working days before the start of the calendar year and shall expire on or before the last day of the same calendar year. Reports of the amount of regulated asbestos containing material removed shall be made at least quarterly to the Program.

(c) Application for revision to an issued asbestos removal permit shall be made by the applicant in writing on a form provided by the Program and shall be received by the Program in accordance with the following:

(1) Revision to a start date for a project that will begin after the start date stated in the approved permit shall be received on or before the previously stated start date or previously revised start date;

(2) Revision to a start date for a project that will begin before the start date stated in the approved permit shall be received at least 10 working days before the new start date;

(3) Revision to a completion date that will be extended beyond the completion date stated in the approved permit shall be received by the original or previously revised completion date;

(4) Revision to a completion date that will be earlier than the completion date stated in the approved permit shall be received by the new completion date; and

(5) Revisions to permits other than start or completion dates shall be submitted to the Program prior to initiating the activity which the revision addresses.

(d) The following shall be maintained on site during removal activities and be immediately available for review by the Program:

(1) a copy of the removal permit issued by the Program and all revisions with the Program's confirmation of receipt;

(2) a copy of applicable asbestos abatement design and project monitoring plan; and

(3) photo identification cards issued by the Program for all accredited personnel performing asbestos management activities.

(e) All permitted removal activities shall be conducted in accordance with 40 CFR Parts 61 and 763, Subpart E, where applicable.

(f) All permitted removals shall be conducted under the direct supervision of an accredited supervisor, except that permitted removals of roofing products may be conducted under the direct supervision of an accredited roofing supervisor. The supervisor or roofing supervisor, as applicable, shall be on-site at all times when removal activities are being performed. For the purpose of this Rule, removal activities for roofing products, means the tear off and disposal activities associated with these products, and does not include the roof replacement.

(g) An asbestos abatement design shall be prepared by an accredited abatement designer for each individually permitted removal of more than 3000 square feet (281 square meters), 1500 linear feet (462 meters) or 656 cubic feet (18 cubic meters), of regulated asbestos containing materials conducted in public areas.

(h) In accordance with G.S. 130A-23, the Program may suspend or revoke the permit for any violation of G.S. 130A, Article 19 or any of the rules of this Section. The Program may also revoke the permit upon a finding that its issuance was based upon incorrect or inadequate information that materially affected the decision to issue the

permit. Notwithstanding permit suspension or revocation for violation of the rules of this Section, an asbestos removal permit shall also be subject to suspension or revocation if the removal activities are in violation of the following provisions with regard to asbestos abatement, as determined by the agencies which administer these Rules:

(1) Department of Labor rules found at Chapter 7, Title 13 of the North Carolina Administrative Code;

(2) Department of Transportation rules found at Title 19A, of the North Carolina Administrative Code;

(3) Solid Waste Management rules found at Chapter 13, Title 15A of the North Carolina Administrative Code.

(i) All waste shipment records shall be submitted to the Program by the building owner or a representative of the owner for all asbestos removal projects permitted under this Rule. This submittal shall be made on a form provided or approved by the Program. This form shall include at least all of the information specified under the waste shipment record requirements of 40 CFR Part 61, Subpart M, Section 61.150(d) as adopted in Rule .0609 of this Section.

(j) The following schedule shall be adhered to in the submittal of waste shipment records:

(1) For individually permitted asbestos removals, the waste shipment records shall be postmarked or received by the Program within 45 days from the completion date provided on the permit; and

(2) For nonscheduled asbestos removals, the waste shipment records shall be postmarked or received by the Program within 30 days after the end of each quarter.

History Note: *Authority G.S. 130A-5(3); 130A-449; P.L. 99-519;*
Temporary Rule Eff. November 1, 1989 for a period of 180 days to expire on April 30, 1990;
Eff. February 1, 1990;
Amended Eff. October 1, 1994; August 1, 1991;
Temporary Amendment Eff. November 8, 1994 for a period of 180 days or until the permanent rule becomes effective, whichever is sooner;
Amended Eff. July 1, 1996; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. February 16, 2019.

10A NCAC 41C .0606 FEES

(a) The fee required by G.S. 130A-450 shall be submitted with an application for the asbestos containing material removal permit. The fees shall be as follows:

(1) Fees for the removal of floor tiles, cementitious asbestos containing wallboard or panels and asbestos containing roofing material shall be one percent of the contract price or ten cents ($0.10) per square foot, whichever is greater;

(2) Fees for the removal of ceiling tiles shall be one percent of the contract price or ten cents ($0.10) per square foot, whichever is greater;

(3) Fees for the removal of surfacing material, thermal system insulation and other asbestos containing materials shall be one percent of the contract price or twenty cents ($0.20) per square or linear foot, whichever is greater;

(4) Fees for demolition shall be a maximum of three hundred dollars ($300.00). Demolition, for the purposes of this Rule only, means the act of razing a building or structure, or portion thereof, to the ground. Removal of regulated asbestos containing material from any undemolished portion of a building or structure shall be permitted as an individual asbestos removal; and

(5) An owner of any single family dwelling in which the owner resides or will reside after the asbestos removal is complete is exempt from permit fees. A permit shall not be issued until the required fee is paid.

(b) The fee required by G.S. 130A-448(a) shall be submitted with an application for accreditation or reaccreditation. The amount of the fee shall be one hundred dollars ($100.00) for each category, except that the fee for persons applying for accreditation or reaccreditation as workers or roofing workers shall be twenty-five dollars ($25.00). However, if a person applies for accreditation or reaccreditation in more than one category per calendar year, the amount of the fee shall be one hundred dollars ($100.00) for accreditation or reaccreditation in the first category and seventy-five ($75.00) for accreditation or reaccreditation in each remaining category, except for workers. A person shall not be accredited or reaccredited until the required fee is paid.

(c) The fees required by G.S. 130A-448(b) shall be submitted with the application for each initial course approval and each renewal course approval. The amount of the fee shall be one thousand five hundred dollars ($1,500.00) for each initial course approval and two hundred dollars ($200.00) for each renewal course approval.

History Note: *Authority G.S. 130A-5(3); 130A-448(a); 130A-448(b); 130A-450; P.L. 99-519;*
Temporary Rule Eff. November 1, 1989 for a period of 180 days to expire on April 30, 1990;
Eff. February 1, 1990;
Amended Eff. October 1, 1994; August 1, 1991;
Temporary Amendment Eff. November 8, 1994 for a period of 180 days or until the permanent rule becomes effective, whichever is sooner;
Amended Eff. July 1, 1996; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. February 16, 2019.

10A NCAC 41C .0607 ASBESTOS EXPOSURE STANDARD FOR PUBLIC AREAS

(a) The maximum allowable ambient asbestos level in the air for public areas shall be:

(1) 0.01 fibers per cubic centimeter as analyzed by phase contrast microscopy, or

(2) arithmetic mean of less than or equal to 70 structures per millimeter square as analyzed by transmission electron microscopy, or

(3) a Z-Test result that is less than or equal to 1.65 as analyzed by transmission electron microscopy.

(b) For individually permitted asbestos removals, ambient air sampling shall be conducted in public areas adjacent to the work area. Initial sampling shall be conducted on the day that regulated asbestos containing material removal begins. The sampling shall continue on a daily basis unless, or until, the supervising air monitor specifies differently. Potential public asbestos exposure shall be considered when determining the frequency and location of the sampling.

(c) Clearance air sampling shall be conducted in accordance with Paragraphs (d) and (e) of this Rule for all individually permitted asbestos removal projects conducted in public areas. Clearance air samples shall be analyzed by:

(1) transmission electron microscopy and comply with the levels specified under Subparagraph (a)(2) or (a)(3) of this Rule for each individually permitted removal of more than 3000 square feet (281 square meters), 1500 linear feet (462 meters), or 656 cubic feet (18 cubic meters) of regulated asbestos containing material; or

(2) transmission electron microscopy or phase contrast microscopy and comply with the levels specified in Paragraph (a) of this Rule for all other permitted asbestos removals, including asbestos removals exceeding threshold amounts stipulated in Subparagraph (c)(1) of this Rule in buildings scheduled for demolition. Demolition, for the purposes of this Rule, means as defined in Rule .0606(a)(4) of this Section.

(d) Phase contrast microscopy and transmission electron microscopy sampling and analysis methods shall be conducted in accordance with 40 CFR Part 763, Subpart E.

(e) Sample analysis for phase contrast microscopy or transmission electron microscopy samples shall be performed by a laboratory meeting the requirements of P.L. 99-519 and 40 CFR 763 and accompanying appendices. Laboratories performing phase contrast microscopy analysis pursuant to this Rule shall have a rating of proficient by the American Industrial Hygiene Association's Proficiency Analytical Testing Program. Individuals performing phase contrast microscopy analysis at the asbestos removal location shall be rated proficient in the American Industrial Hygiene Association's Asbestos Analysts Registry Program. If all microscopists in a particular laboratory performing phase contrast microscopy analysis are rated as proficient by the Asbestos Analysts Registry Program, enrollment and proficiency in the Proficiency Analytical Testing Program is not required.

(f) A final visual inspection shall be conducted by an accredited air monitor or an accredited supervising air monitor for all permitted asbestos removals conducted in public areas. This visual inspection shall be conducted prior to clearance air sampling. The final visual inspection shall assure that all asbestos containing residue, dust, and debris and asbestos contaminated equipment has been removed.

(g) Any person performing ambient or clearance air sampling or visual inspection during an asbestos removal as specified under Paragraphs (b), (c), and (f) of this Rule shall be retained by the building owner. Neither the accredited supervising air monitor nor accredited air monitor shall be employed by the contractor hired to conduct the asbestos removal except that:

(1) this restriction in no way applies to personal samples taken to evaluate worker exposure as required by Occupational Safety and Health Act; and

(2) this restriction shall not apply when the contractor and air monitor have disclosed their association to the building owner and the building owner approves this association in writing.

(h) For air sampling and visual inspections conducted under Paragraphs (b), (c), and (f) of this Rule, the supervising air monitor shall:

(1) Prepare, prior to the removal start date, an abatement project monitoring plan which takes into consideration at least the abatement project scope of work, building use, occupant locations and their potential for exposure to airborne asbestos fibers, type of asbestos containing material, and the asbestos abatement design, including work practices and engineering controls. The plan shall include air sampling procedures, air sample locations and air sampling frequency. This sampling plan may be amended by the supervising air monitor as needed. This requirement shall apply to each individually permitted removal of more than 3000 square feet (281 square meters), 1500 linear feet (462 meters), or 656 cubic feet (18 cubic meters) of regulated asbestos containing materials;

(2) Ensure that ambient air sampling results shall be available on-site:

(A) within 24 hours of sample collection and analysis by phase contrast microscopy;
(B) within 48 hours of sample collection and analysis by transmission electron microscopy;

(3) Personally inspect any individually permitted asbestos removal project:
(A) that exceeds 10 working days in length, but does not exceed 30 working days, at least once; or
(B) that exceeds 30 working days in length, at least once in the first 30 working days and at least once every 30 working days thereafter;

(4) Prepare a written, signed and dated report documenting all site visits made to the removal, final visual inspection, and all ambient and clearance air sampling conducted. This report shall be supplied by the supervising air monitor to the building owner. The building owner shall supply a copy of the report to the Program upon request.

History Note: *Authority G.S. 130A-5(3); 130A-446; P.L. 99-519;*
Temporary Rule Eff. November 1, 1989 for a period of 180 days to expire on April 30, 1990;
Eff. February 1, 1990;
Amended Eff. October 1, 1994; August 1, 1991;
Temporary Amendment Eff. November 8, 1994 for a period of 180 days or until the permanent rule becomes effective, whichever is sooner;
Amended Eff. July 1, 1996; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. February 16, 2019.

10A NCAC 41C .0608 TRAINING COURSE INSTRUCTOR QUALIFICATIONS

(a) Any person seeking approval as an instructor for courses covered under 40 CFR Part 763, Subpart E, Appendix C, Rule .0603(a)(3) and .0611 of this Section shall meet the applicable requirements listed in this Rule.

(b) All training course providers shall submit to the Program the following:

(1) a completed application on a form provided by the Program and available at https://epi.dph.ncdhhs.gov/asbestos/healthaz.html. A completed application form shall include the following information:

(A) name, address, and telephone number of the applicant;

(B) name, address and telephone number of the training provider that is employing the applicant;

(2) when training course completion is a requirement pursuant to Rule .0602 of this Section, confirmation of completion of an approved training course. The confirmation shall be in the form of an original certificate of completion of the approved training course or the following information:

(A) the course title;

(B) dates of the course instruction;

(C) name(s) of instructor(s); and

(D) name, address and telephone number of the training provider;

(3) when education is a requirement, a copy of the high school diploma or equivalent;

(4) when work experience is a requirement pursuant to Rule .0602 of this Section, documentation of the applicant's work history, including the following:

(A) employer name;

(B) employer address and phone number;

(C) position(s) held by applicant;

(D) dates when the applicant held each position; and

(E) copies of any licenses, registrations, certifications, or accreditations related to the subject matter to be taught; and

(5) when experience as an instructor is a requirement pursuant to Rule .0602 of this Section, documentation of instructional experience including the following:

(A) name(s) of the course(s) taught;

(B) the topic that the applicant taught for each course;

(C) the dates of the courses that the applicant taught; and

(D) the name, address, and phone number of each training organization for which experience is claimed.

(c) Training courses shall include instruction on specific topics as follows:

(1) for the worker and roofing worker courses: current best practices;

(2) for the supervisor and roofing supervisor courses: current best practices and techniques for asbestos abatement activities;

(3) for the inspector course: pre-inspection planning and review of previous inspection records, inspecting for friable and nonfriable asbestos containing materials and assessing the condition of friable asbestos containing materials, bulk sampling and documentation of asbestos in schools, recordkeeping and writing inspection reports;

(4) for the management planner course: evaluation and interpretation of survey results, hazard assessment, developing an operations and maintenance plan, recordkeeping for the management planner, and assembling and submitting the management plan;

(5) for the abatement designer course: safety system design specifications, designing abatement solutions, budgeting and cost estimation, writing abatement specifications, preparing abatement drawings and occupied buildings; and

(6) for the project monitor course: asbestos abatement contracts, specifications and drawings, response actions and abatement practices, air monitoring strategies, conducting visual inspections, and recordkeeping and report writing.

(d) Instructors for topics, hands-on exercises, workshops, or field trips covered under 40 CFR Part 763, Subpart E, Appendix C shall meet the following requirements as applicable:

(1) For the worker initial and refresher and the supervisor initial and refresher courses:

(A) the applicant shall have completed the initial and subsequent refresher training course requirements for supervisor; and

(B) the applicant shall meet at least one of the following education and asbestos work experience combinations:

(i) If the applicant does not possess either a high school diploma or equivalent, the applicant shall:

(I) have at least 1440 hours experience in a worker or supervisory capacity in a contained work area; and

(II) have at least 360 hours as an instructor in an Environmental Protection Agency-approved or Program approved worker course.

(ii) If the applicant possesses either a high school diploma or equivalent, the applicant shall:

(I) have at least 960 hours experience in a worker, supervisory, or consulting capacity in a contained work area; or

(II) have at least 240 hours as an instructor in an Environmental Protection Agency-approved or Program approved asbestos worker or supervisor course, or other courses that provide instruction on the occupational safety and health topics described in 29 CFR Parts 1910 and 1926 or environmental safety and health topics described in 40 CFR Parts 50 through 503, Parts 700 through 799, and Parts 1000 through 1099.

(iii) If the applicant possesses at least an associate degree from an accredited college or university, the applicant shall:

(I) have at least 480 hours experience in a worker, supervisory, or consulting capacity in a contained area; or

(II) have at least 120 hours as an instructor in an Environmental Protection Agency-approved or Program approved asbestos worker or supervisor course, or other courses that provide instruction on the occupational safety and health topics described in 29 CFR Parts 1910 and 1926 or environmental safety and health topics described in 40 CFR Parts 50 through 503, Parts 700 through 799, and Parts 1000 through 1099.

(2) For the inspector initial and refresher courses:

(A) the applicant shall have successfully completed the initial and subsequent refresher training course requirements for inspector; and

(B) the applicant shall meet at least one of the following education and asbestos work experience combinations:

(i) If the applicant possesses either a high school diploma or equivalent, the applicant shall:

(I) have documented experience, including asbestos inspections in at least 1,000,000 square feet of building space in the past three years; or

(II) have at least 60 hours as an instructor in an Environmental Protection Agency-approved or Program approved inspector course, or other courses that provide instruction on the occupational safety and health topics described in 29 CFR Parts 1910 and 1926 or environmental safety and health topics described in 40 CFR Parts 50 through 503, Parts 700 through 799, and Parts 1000 through 1099.

(ii) If the applicant possesses at least an associate degree from an accredited college or university, the applicant shall:

(I) have documented experience, including asbestos inspections in at least 500,000 square feet of building space in the past three years; or

(II) have at least 40 hours as an instructor in an Environmental Protection Agency-approved or Program approved inspector course, or other courses that provide instruction on the occupational safety and health topics described in 29 CFR Parts 1910 and 1926 or environmental safety and health topics described in 40 CFR Parts 50 through 503, Parts 700 through 799, and Parts 1000 through 1099.

(3) For the management planner initial and refresher courses:

(A) the applicant shall have successfully completed the initial and subsequent refresher training course requirements for management planner; and

(B) the applicant shall meet at least one of the following education and asbestos work experience combinations:

(i) If the applicant possesses either a high school diploma or equivalent, the applicant shall:

(I) have documented management planning experience showing at least 25 management plans or reinspection reports written in the past three years, or documented experience as the management consultant for at least 25 asbestos projects in the past three years, or a combination of management plans and projects managed; or

(II) have at least 48 hours as an instructor in an Environmental Protection Agency-approved or Program approved management planner course or other courses that provide instruction on the occupational safety and health topics described in 29 CFR Parts 1910 and 1926 or environmental safety and health topics described in 40 CFR Parts 50 through 503, Parts 700 through 799, and Parts 1000 through 1099.

(ii) If the applicant possesses at least an associate degree from an accredited college or university, the applicant shall:

(I) have documented management planning experience showing at least 12 management plans or reinspection reports written in the past three years, or documented experience as the management consultant for at least 12 asbestos projects in the past three years, or a combination of management plans and projects managed; or

(II) have at least 32 hours as an instructor in an Environmental Protection Agency-approved or Program approved management planner course or other courses that provide instruction on the occupational safety and health topics described in 29 CFR Parts 1910 and 1926 or environmental safety and health topics described in 40 CFR Parts 50 through 503, Parts 700 through 799, and Parts 1000 through 1099.

(4) For the project designer initial and refresher courses:

(A) the applicant shall have successfully completed the initial and subsequent refresher training course requirements for abatement project designer; and

(B) the applicant shall meet at least one of the following education and asbestos work experience combinations:

(i) If the applicant possesses either a high school diploma or equivalent, the applicant shall:

(I) have documented asbestos abatement project design experience including the design of at least 12 asbestos projects in the past three years; or

(II) have at least 30 hours as an instructor in an Environmental Protection Agency-approved or Program approved abatement project designer course or other courses that provide instruction on the occupational safety and health topics described in 29 CFR Parts 1910 and 1926 or environmental safety and health topics described in 40 CFR Parts 50 through 503, Parts 700 through 799, and Parts 1000 through 1099.

(ii) If the applicant possesses at least an associate degree from an accredited college or university, the applicant shall:

(I) have documented asbestos abatement project design experience, including the design of at least six asbestos projects in the past three years; or

(II) have at least 20 hours as an instructor in an Environmental Protection Agency-approved or Program approved abatement project designer course or other courses that provide instruction on the occupational safety and health topics described in 29 CFR Parts 1910 and 1926 or environmental safety and health topics described in 40 CFR Parts 50 through 503, Parts 700 through 799, and Parts 1000 through 1099.

(5) For the project monitor initial and refresher courses:

(A) the applicant shall meet the qualifications for project designer instructor under Subparagraph (d)(4) of this Rule or the qualifications for supervisor instructor under Subparagraph (d)(1) of this Rule to teach the work practice topics of asbestos abatement contracts, specifications and drawings or response action and abatement practices;

(B) the applicant for work practice topics of air monitoring strategies, conducting visual inspections, and recordkeeping and report writing shall:

(i) possess either a high school diploma or equivalent;

(ii) successfully complete a Program approved NIOSH 582 course, Program approved NIOSH 582 Equivalency Course or a Program approved project monitor course; and

(iii) have documented asbestos air monitoring experience on at least six asbestos removals.

(e) Instructors who teach one or more segments of a training course covered under 40 CFR Part 763, Subpart E, Appendix C, Rule .0603(a) or Rule .0611 of this Section, other than work practice topics, hands-on exercises, workshops, or field trips, shall meet the following requirements:

(1) be currently working in the field of expertise in which training is conducted; and

(2) have a minimum of a high school diploma or equivalent.

(f) Instructors for a Program approved NIOSH 582 or Program approved NIOSH 582 Equivalency Course shall meet the following requirements:

(1) have a high school diploma or equivalent;

(2) attend a NIOSH 582 training course or a Program approved NIOSH 582 Equivalency Course; and

(3) for teaching the NIOSH 7400 Method, have at least three months work experience as a microscopist performing analysis using the NIOSH 7400 Method.

(g) Instructors who teach work practice or hands-on topics in Program approved roofing worker or roofing supervisor initial or refresher courses shall meet the following requirements:

(1) have a high school diploma or equivalent;

(2) successfully complete either an initial asbestos supervisor or initial asbestos roofing supervisor course, and subsequent annual refreshers courses;

(3) successfully complete an initial asbestos inspector course; and

(4) have at least three months' experience as a roofing supervisor or asbestos supervisor.

History Note: *Authority G.S. 130A-447;*
Eff. October 1, 1994;
Amended Eff. July 1, 1996;
Readopted Eff. January 1, 2021.

10A NCAC 41C .0609 ASBESTOS NESHAP FOR RENOVATIONS AND DEMOLITIONS

(a) Each owner or operator of a renovation or demolition activity, as defined in 40 CFR 61.141, shall comply with all applicable requirements of the Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) for renovations and demolitions as found in 40 CFR Part 61, Subparts A and M. 40 CFR Part 61, Subparts A and M are hereby incorporated by reference, including any subsequent amendments and editions. This document is available for inspection at the Division of Public Health, 1915 Mail Service Center, Raleigh, North Carolina 27699-1915. Copies may be obtained free of charge by writing the Division of Public Health, 1915 Mail Service Center, Raleigh, North Carolina 27699-1915.

(b) All reports, applications, submittals, and other communications required to be submitted under Paragraph (a) of this Rule shall be submitted to the Director, Division of Epidemiology, rather than to the Environmental Protection Agency, except that such asbestos NESHAP documents pertaining to renovations and demolitions within local air pollution program jurisdictions shall be submitted to the local program.

History Note: *Authority G.S. 130A-451;*
Temporary Adoption Eff. November 8, 1994 for a period of 180 days or until the permanent rule becomes effective, whichever is sooner;
Eff. January 1, 1995;
Amended Eff. July 1, 1996;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. February 16, 2019.

10A NCAC 41C .0610 LOCAL AIR POLLUTION PROGRAMS

The Department shall authorize local air pollution programs certified as of October 1, 1994, pursuant to G.S. 143-215.112 to enforce the asbestos NESHAP for renovations and demolitions so long as the local program maintains its certification pursuant to G.S. 143-215.112.

History Note: *Authority G.S. 130A-452;*
Temporary Adoption Eff. November 8, 1994 for a period of 180 days or until the permanent rule becomes effective, whichever is sooner;
Eff. January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. February 16, 2019.

10A NCAC 41C .0611 REQUIREMENTS FOR ASBESTOS ROOFING TRAINING COURSES

(a) Pursuant to Rule .0602 of this Section, applicants for accreditation and reaccreditation as a roofing worker or roofing supervisor are required to successfully complete a training course approved by the Program under this Rule. Initial and refresher training courses for roofing workers and roofing supervisors shall meet requirements of this Rule and Rule .0603 of this Section.

(b) Initial training courses for roofing workers shall be at least one day in length and cover the following topics:

(1) Physical characteristics of asbestos, including the identification of asbestos, the aerodynamic characteristics, and the typical uses of asbestos in roofing materials;

(2) Health effects related to asbestos exposure, including the nature of asbestos related diseases, the routes of exposures, the dose-response relationship, the lack of a safe exposure level, the latency period, cigarette smoking and asbestos exposure, medical surveillance programs, and information on smoking cessation programs;

(3) State-of-the art work practices, including proper work techniques to minimize fiber release, removal procedures for cement roofing products versus built-up roofing products, discussion of prohibited work practices, wetting, hand tools, power tools, HEPA vacuumed tools, waste disposal procedures, and controlling access to work areas;

(4) Personal protection equipment, including the classes and characteristics of respirator types, limitations, proper selection, inspection, donning, use and storage procedures for respirators, fit testing, components of a proper respiratory protection program, selection and use and storage of non-disposable clothing, hard hats, safety glasses, and non-slip shoes;

(5) Personal hygiene, including entry and exit procedure for the work area, avoidance of eating, smoking, and chewing in the work area, and potential exposures, such as family exposures;

(6) Safety practices and hazard prevention during removal of roofing materials and emergency procedures, including hazards posed by wet working conditions, electrical hazards, slips, trips, heat/cold stress, falls, and scaffold and ladder hazards; and

(7) Review of state, federal, and local rules and regulations, including, an overview of the asbestos regulations under the National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61, Subpart M), Occupational Safety and Health Act (29 CFR 1926.1101), these Rules, and other pertinent rules and regulations.

(c) Initial training courses for roofing supervisors shall be at least two days in length and cover the topics under Paragraph (b) of this Rule. The following additional topics shall be covered in roofing supervisor courses:

(1) Discussion of the competent person duties required by the Occupational Safety and Health Act, Asbestos Construction Standard, 29 CFR 1926.1101(o), as adopted by 13 NCAC 7F .0201 and amendment or recodification as adopted by the North Carolina Department of Labor;

(2) Pre-work activities and considerations, including the determination of asbestos containing roofing products, bulk sampling procedures, analytical methods, inspection reports, and air monitoring procedures;

(3) Assessment of the work area, including isolation of the work area, considerations if the work area is adjacent to an occupied area, and items requiring special protection;

(4) Site considerations and preparations, designating the regulated areas, setting up the barricade, and warning signs; and

(5) Supervisory techniques, including worker training, housekeeping, recordkeeping, and documentation requirements.

(d) The state-of-the-art work practice topics shall include a segment of hands-on activities, which allows the students an opportunity to use and handle equipment found on asbestos roofing projects. The hands-on activities shall be a minimum of two hours for the roofing worker course and four hours for roofing supervisor course.
(e) The refresher training course for roofing workers shall be at least one-half day and for the roofing supervisor course shall be at least one day in length. These courses shall review and discuss changes in the Federal and State regulations, developments in the state-of-the-art work procedures, and key aspects of the initial courses as provided in Paragraphs (b) and (c) this Rule.
(f) At the completion of the initial roofing worker and roofing supervisor course the training provider shall administer a written closed book examination, approved by the Program. The examination shall be in multiple choice format, with a minimum of 50 questions for the roofing supervisor course and 25 questions for the roofing worker course. For successful completion of the course, the student shall pass the examination with a minimum score of 70 percent. The refresher training course examination for these disciplines shall meet the requirements of Rule .0603(c) of this Section.

History Note: *Authority G.S. 130A-447;*
Eff. July 1, 1996;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. February 16, 2019.

COMMON QUESTIONS

Asbestos Hazard Management Program

ACCREDITATION

1. **Is a person considered accredited by simply taking an approved training course and passing the exam?** No. In order to be accredited through the Program, an application must first be submitted (Asbestos Accreditation form [DHHS 3699]). Information required on the application includes, but is not limited to, confirmation of training, and, if applicable, work experience and education. The application must also be accompanied by two 1 1/4" by 1 1/4" color photographs of the applicant and the appropriate accreditation fee. (01/22/90) (Revised 05/31/91) (Revised 12/27/94)

2. **What is required for confirmation of training?** Training documentation may be submitted in one of three forms: (1) the original certificate (photocopies and notarized copies will not be accepted); (2) an original confirmation letter from the training agency on the training agency's letterhead; or (3) an original attendee list from the training agency, with the applicant's name included, on the training agency's letterhead. Remember that original documentation of initial training, as well as all refresher courses, must be submitted for initial accreditation. All original certificates will be returned to the applicant. (08/01/91) (Revised 02/07/95) (Revised 10/96)

3. **Once paperwork for accreditation has been submitted, how long does it take to process the paperwork?** The processing time for an application is approximately two weeks from the date of receipt. If the application is incomplete, all paperwork and a letter of explanation will be returned to the applicant within the same length of time. (01/03/95)

4. **Can a lost accreditation photo-identification card be replaced?** Yes. In order to obtain a duplicate card for a lost accreditation photo-identification card a completed application form, one 1 1/4" x 1 1/4" current, color photograph, and a fee of ten dollars ($10.00) payable by check or money order must be submitted to the Health Hazards Control Unit (HHCU). (Revised 3/16)

5. **Can an appointment be made for having my accreditation processed?** No.
Completed paperwork for accreditation applications may be hand delivered to the HHCU office Monday through Friday from 8:00 am to 5:00 PM. Applications will be processed in the order they are received. Applications will not be processed while you wait.
(01/03/95)(Revised 03/25)

6. **How does the accreditation fee schedule work?** The fee for all accreditations, with the exception of workers, is one hundred dollars ($100.00) annually for accreditation in a single discipline and seventy-five dollars ($75.00) annually for accreditation in each additional discipline. The multiple accreditation fee ($75.00) applies only to those individuals who are accredited in more than one category. Individuals who maintain only one accreditation will be required to pay one hundred dollars ($100.00) each time an accreditation is renewed. The fee for worker accreditation is always twenty-five dollars ($25.00) per person. (08/01/91) (Revised 10/96)

7. **What are the training requirements for accreditation renewal?** To maintain accreditation under the Asbestos Hazard Management Program Rules, a person must take an approved refresher course within twelve (12) months of the initial course or last refresher course. No individual may continue asbestos management activities after the 12th month, unless a refresher course has been completed and they have been reaccredited by the HHCU. If an individual does not obtain the required refresher training within 24 months, the initial training must be repeated prior to issuance of accreditation. (02/07/95)(Revised 10/96)

8. **What are the training requirements for air monitor and supervising air monitor accreditation?** Air monitors and supervising air monitors shall:

1. (a) Complete a Program approved NIOSH 582 or Program approved NIOSH 582 equivalent; and
   (b) meet the initial and refresher training requirements for supervisors (a Program approved project monitor refresher course may be substituted for the supervisor refresher course); or
2. Meet the initial and refresher training requirements for a Program approved five-day project monitor course and a Program approved project monitor annual refresher course.

Individuals should contact the HHCU to ensure that training courses are Program approved prior to applying for accreditation. (08/01/91) (Revised 12/17/94; 02/28/95) (Revised 10/96)

9. **What are the "Professional Status" requirements for supervising air monitors?** All supervising air monitors accredited on or after February 1, 1991, shall be Certified Industrial Hygienists. Professional Engineers and Registered Architects who were accredited as air monitors prior to this date and who have continuously maintained their accreditation may also be accredited as supervising air monitors. (2/05/95)

10. **May a building owner use non-accredited employees to perform asbestos abatement activities?** Yes. Workers are not required to be accredited when performing small-scale, short-duration activities (SSSD); however, OSHA regulations require training. Small-scale, short-duration activities are tasks such as, but not limited to, the following: removal of asbestos-containing insulation on pipes; removal of small quantities of asbestos-containing insulation on beams or above ceilings; replacement of an asbestos-containing gasket on a valve; installation or removal of a small section of drywall; removal of small quantities of ACM only if required in the performance of another maintenance activity not intended as asbestos abatement; removal of asbestos-containing thermal system insulation not to exceed amounts greater than those which can be contained in a single glove bag; minor repairs to damaged thermal system insulation which do not require removal; repairs to a piece of asbestos-containing wallboard; and repairs involving encapsulation, enclosure, or removal of small amounts of friable ACM only if required in the performance of emergency or routine maintenance activity and not intended solely as asbestos abatement. Such work may not exceed amounts greater than those which can be contained in a single prefabricated mini-enclosure or glove bag. Such an enclosure shall conform spatially and geometrically to the localized work area, in order to perform its intended containment function. (2/05/95)(Revised 10/96)

11. **Does an individual need to be accredited when "prepping" a removal site?** Yes. Work area preparation activities require the use of accredited workers. Preparation is part of an asbestos removal, and the proper methods of preparation are taught in the worker and supervisor training courses. If there are special circumstances, such as the erection of scaffolding or wooden walls that involve workers in a specific trade where no contact with asbestos containing materials will occur, this work can proceed with non-accredited workers. (07/15/90) (Revised 12/27/94)

12. **When is a worker eligible to begin working on an asbestos removal site?** If the applicant for worker accreditation has submitted a completed application form to the HHCU accompanied by the proper confirmation of training, two 1 1/4" x 1 1/4" color photographs of the applicant, and the accreditation fee, the worker may work up to 90 days without an accreditation issued by the Program. After an application is submitted, you should contact the HHCU to ensure that the application is complete prior to permitting the worker on the job site. This policy applies only to workers and roofing workers. **All other disciplines require accreditation and receipt of the photo-identification card prior to performing asbestos abatement activities.** (08/01/91) (Revised 02/07/95) (Revised 10/96)

PERMITS/NOTIFICATIONS

13. **When am I required to submit an Asbestos Permit Application and Notification for Demolition/Renovation?** Submitting the Asbestos Permit Application and Notification for Demolition/Renovation Form satisfies the requirements of both the National Emission Standards for Hazardous Air Pollutants (NESHAP) and North Carolina AHMP Rules pertaining to asbestos removals. An Asbestos Permit Application and Notification for Demolition/Renovation Form is to be submitted for the following occurrences:

A. Individual asbestos removals where 160 square feet, 260 linear feet, or 35 cubic feet or greater of regulated asbestos containing material (RACM) is to be removed.

B. Nonscheduled asbestos removals involving less than 160 square feet, 260 linear feet or 35 cubic feet of regulated asbestos containing material if the additive total amount of material removed from the facility during a calendar year exceeds 160 square feet, 260 linear feet or 35 cubic feet.

A nonscheduled asbestos removal is a removal required by equipment failure, which is expected to occur within a given period based on past operating experience, but for which an exact date cannot be predicted.

C. Emergencies involving the removal of 160 square feet, 260 linear feet, or 35 cubic feet or greater of regulated asbestos containing material. An emergency removal is a removal that was not planned, but results from a sudden, unexpected event that, if not immediately attended to, presents a safety or public health hazard, is necessary to protect equipment from damage, or is necessary to avoid imposing an unreasonable financial burden. The emergency removal permit application must be received as early as possible but not later than the working day following the start of the demolition.

D. Demolition of a building, whether or not it contains asbestos. A demolition is the wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of any facility. The moving of a building or structure from one location to another is also considered a demolition.

E. If the building is being demolished under an order of a State or local government agency, issued because the building is structurally unsound and in danger of imminent collapse. In such cases, the notification is required, but the ten working day notification period is suspended in order to protect the public health. The ordered demolition notification must, however, be received as early as possible, but not later than, the working day following the start of the demolition. Copies of the notification and/or demolition order may be submitted via facsimile, but this submittal does not relieve the owner, or his representative, of the responsibility for submitting the originals by the next working day. (02/08/95) (Revised 08/96)

14. **When I submit a permit/notification application, must it be on the form provided by the HHCU office?** Yes, it must be submitted on an Asbestos Permit Application and Notification for Demolition/Renovation Form (DHHS 3768-Revised 09/2016). You are free to copy the form or, with prior approval by the Program, create the form. (02/16/95; 8/96; 8/10; 09/2016)

15. **Where should the completed Asbestos Permit Application and Notification for Demolition/Renovation (DHHS 3768) be submitted?** The application/notification should be submitted to the following address if sent via regular postal service:

Permit Secretary
NCDHHS – Division of Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

If sent overnight express, the completed application should be sent to:

Permit Secretary
NCDHHS – Division of Public Health
Health Hazards Control Unit
5505 Six Forks Road, 2nd Floor, Room D-1
Raleigh, North Carolina 27609

Permit applications may also be hand delivered Monday through Friday from 8:00 am to 5:00 pm to the HHCU office. (02/08/95)(Revised 08/96)(Revised 8/05)

16. **Are any other forms required to be submitted for asbestos removals or demolition projects in North Carolina?** Possibly - Besides the Health Hazards Control Unit, there are three local programs in the State of North Carolina responsible for enforcing the NESHAP regulations within their jurisdiction. These local programs should be contacted concerning specific requirements for projects conducted in their areas. A permit application submitted to the North Carolina Health Hazards Control Unit may be required under the Program Rules, even when working in the local program areas. The local programs are as follows:

Buncombe County
WNC Regional Air Pollution Control Agency
125 South Lexington Avenue, Suite 101
Asheville, North Carolina 28801
Telephone: 828-250-6777

Forsyth County
Environmental Assistance & Protection
Forsyth County Government Center
201 N. Chestnut Street, 5th Floor
Winston-Salem, North Carolina 27101
Telephone: 336-703-2440

Mecklenburg County
Land Use and Environmental Services Agency—Air Quality
2145 Suttle Avenue
Charlotte, North Carolina 28208
Telephone: 704-336-5430

(02/08/95; Revised date: 12/00; 3/07; 3/11, 9/11, 7/12, 9/16)

17. **Will incomplete Asbestos Permit Application and Notification for Demolition/ Renovation forms (DHHS 3768) be accepted by the Health Hazards Control Unit?** No. Asbestos Permit Application and Notification for Demolition/Renovation Forms submitted to the Program must be filled out completely to be accepted. If information is missing, the Asbestos Permit Application and Notification for Demolition/Renovation Form will be rejected and returned to the applicant. (02/08/95)(Revised 08/96)

18. **Does the Health Hazards Control Unit (HHCU) accept telefaxed Asbestos Permit Application and Notification for Demolition/Renovation forms?** No. The HHCU does not accept telefaxed Asbestos Permit Application and Notification for Demolition/Renovation Forms. The Health Hazards Control Unit will accept Asbestos Permit Application and Notification for Demolition/Renovation Forms delivered by U.S. Postal Service, commercial delivery service, or hand delivery. (02/08/95)(Revised 08/96)

19. **Does the Health Hazards Control Unit (HHCU) accept telefaxed Revision for Permit/Notification forms (HHCU 3768-R, Revised 09/2016)?** Yes. Upon receipt, telefaxed revisions are initialed and dated by Program personnel and then faxed back to the contact person who signed the revision. (02/08/95)(Revised 08/96,09/2016)

20. **How does the Health Hazards Control Unit (HHCU) calculate the ten working day notification period?** Working days are defined as Monday through Friday, including holidays that fall on any of these days. The date that the completed form is postmarked for delivery to the HHCU office, or, if hand-delivered, the date that the completed form is received at the HHCU office, is the first day of the notification period. Removal or demolition activities may start on the tenth working day. (02/08/95)(Revised 08/96)

21. **Should the Health Hazards Control Unit (HHCU) be notified of changes in removal dates?** Yes. The permit shall be revised to reflect any change in the removal dates as follows:
    (1) Revision to a start date for a project that will begin after the start date stated in the approved permit shall be received on or before the previously stated start date or previously revised start date;
    (2) Revision to a start date for a project that will begin before the start date stated on the approved permit shall be received at least 10 working days before the new start date;
    (3) Revision to a completion date that will be extended beyond the completion date stated in the approved permit shall be received by the original or previously revised completion date; and
    (4) Revision to a completion date that will be earlier than the completion date stated in the approved permit shall be received by the new completion date. (02/08/95)(Revised 08/96)

22. **Are permit revisions going to be required every time the day and hours of work change?** Notification should be made when there is any major permanent change in working hours, such as starting a second shift or deciding to work on weekends. (02/12/95)

23. **When additional regulated asbestos containing materials are identified for removal during an asbestos removal project, do the additional materials have to be reported?** Yes, and any additional fees that may be applicable shall be paid. (02/12/95)(Revised 08/96)

24. **Can the ten working day notification be waived if an emergency occurs, such as a boiler failure requiring the removal of 300 square feet of TSI?** Yes. For emergency operations involving asbestos removal of more than 160 square, 260 linear, or 35 cubic feet, the ten working day notice may be waived. The Asbestos Permit Application and Notification for Demolition/Renovation Form shall be postmarked or received by the HHCU office as early as possible before, but not later than, the first working day following the emergency. Applications for emergency asbestos removal permits must be accompanied by a letter from the owner or his representative explaining the cause of the emergency. (02/08/95)(Revised 08/96)

25. **If an owner has a nonscheduled removal permit in place and a boiler fails (routine failure of equipment) requiring the removal of 300 square feet of TSI, can this project be performed as a nonscheduled asbestos removal without further notification or waiting period?** No. It must be performed as an individual asbestos removal and an Asbestos Permit Application and Notification for Demolition/Renovation Form is required. The ten working day notification requirement may be waived in emergency situations. (02/12/95)

26. **Can a project be placed "on hold"?** Projects may be put on hold, thereby extending the completion date. The work must be completed within twelve (12) months of the original start date. The owner or his representative must submit a revision giving the new start and complete dates prior to resuming work on the project. (02/08/95) (Revised 10/96)

27. **For demolition projects that involve asbestos removals of less than the threshold amounts of 160 square feet, 260 linear feet, and/or 35 cubic feet, must the asbestos removal be included on the Asbestos Permit Application and Notification for Demolition/Renovation Form (DHHS 3768)?** For demolition projects preceded by asbestos removals of less than 160 square feet, 260 linear feet, or 35 cubic feet of regulated asbestos containing material, there is no requirement to notify the HHCU office of the removal unless the facility has already exceeded the threshold amounts for the calendar year. A notification of ten working days prior to the demolition is required. For demolition projects in Buncombe, Forsyth and Mecklenburg Counties, the local programs should be contacted. (02/08/95) (Revised 10/96)

28. **Sometimes it is necessary to conduct asbestos removal projects in phases. How does one permit the start and completion date for the different phases?** There are two possibilities for reporting this information:

    1) Provide a schedule of the dates the phases are to be conducted with the Asbestos Permit Application and Notification for Demolition/Renovation (DHHS 3768). Complete a Permit/Notification Revision form at the start of each subsequent phase with the type of RACM to be removed, location, additional contract price and fee, if applicable. For projects with multiple units, attach a list of the locations and the amount of RACM to be removed for each unit.

    2) If the dates the phases are to be conducted are unknown at the time the Asbestos Permit Application and Notification for Demolition/Renovation Form is submitted, the contractor can submit subsequent permit revisions prior to the start and completion of each phase after the initial project start date. (02/08/95) (Revised 10/96)

29. **Must Waste Shipment Records be submitted to the Health Hazards Control Unit?** For individually permitted asbestos removals, the waste shipment records shall be postmarked or received within 45 days from the completion date provided on the permit. For nonscheduled asbestos removals, the waste shipment records shall be postmarked or received within 30 days after the end of each quarter. (08/96)

FEES

30. **Is an Asbestos Permit Application and Notification for Demolition/Renovation (DHHS 3768-Revised 09/2016) required for regulated asbestos removal projects (greater than 160SF, 260LF or 35CF) to be conducted in a private residence? Are permit fees required?** Yes, an Asbestos Permit Application and Notification for Demolition/Renovation Form is required. For regulated asbestos removals conducted in private residences, where the owner of the property resides, the owner is exempt from the asbestos removal permit fee. (01/05/95) (Revised 08/96;09/2016)

31. **How are fees determined when asbestos is being removed from areas of original installation and the areas have become contaminated from the originally installed material, such as pipe insulation that has delaminated in a crawl space?** The permit fee for these areas will be $.20 per square foot of contaminated area or material - i.e., soil to be removed - plus the appropriate fee [from Block 17 of the Asbestos Permit Application and Notification for Demolition/Renovation (DHHS 3768)] for the square or linear footage of the asbestos containing material remaining intact on the substrate, or 1% of the contract price, whichever is greater. If there is no asbestos containing material remaining intact on the substrate, the permit fee will be $.20 per square foot of the contaminated area or material, or 1% of the contract price, whichever is greater. (02/08/95)

32. **How do you calculate the permit fees for removal of regulated Category I asbestos containing roofing materials?** The fee for removal of regulated Category I asbestos containing roofing materials is 1% of the contract price or $.10 per square foot, whichever is greater. The amount of regulated asbestos containing roofing materials created during removal is calculated based on information found in the NESHAP Interpretative Rule Governing Roof Removal Operations (40 CFR 61, Subpart M, Appendix A). This Rule states that 160 square feet of regulated asbestos containing material is created for each 5580 square feet of Category I asphalt roofing material cut by a rotating blade cutter.

    To calculate the square foot fees, divide the total square footage of the roof by 5580. Multiply this number by 160. The resulting number is then multiplied by $.10 to get the total permit fee. See example below:

    Roof area = 22,320 square feet

    22320 / 5580 = 4
    4 x 160 x $0.10 = $64.00

    (02/08/95)(Revised 10/96)

33. **How do you calculate the permit fees for removal of asbestos containing joint compound used in sheetrock/drywall?** The fees are 1% of the contract price or $.10 per square foot, whichever is greater. To calculate the square foot fees when the joint compound is used only to cover the joints and the nail marks, multiply the total square footage of the wall area by ten percent (10%). The resulting sum is then multiplied by the appropriate permit fee per square foot of material in order to calculate the permit fees. See example below:

    1600 total square feet of wall X .10 = 160 square feet
    160 square feet X $.10/SF = $16.00

    In situations where the joint compound has been used as a skim coat, the entire surface area of the sheetrock/drywall shall be used to calculate the appropriate fees. (02/08/95)

34. **How do you calculate permit fees for the removal of regulated asbestos/cement shingles/panels?** The fees are based upon the tear-off and disposal of regulated asbestos containing cement shingles/panels but not the put-back of new materials. The procedure for calculating the square footage fees for regulated asbestos containing cement shingles/panels is 1% of the contract price or $.10 per square foot, whichever is greater. See example below:

    Example: Asbestos cement shingles/panels area = 22,320 square feet
    22,320 x $.10 = $2,232.00

35. **How do you calculate the permit fees for removal of asbestos containing cementitious panels from inside a cooling tower?** Fees for removal of asbestos containing panels used in cooling towers shall be based on the cubic footage of the cooling tower, not the square footage of the panels in the tower, or 1% of the contract price, whichever is greater. See example below:

    Cooling tower dimensions - 10 feet high x 10 feet long x 10 feet wide
    10 ft x 10 ft x 10 ft = 1000 cubic feet
    1000 cubic feet of cementitious panels x $0.10 = $100.00
    (02/08/95)(Revised 10/96)

36. **What is the Health Hazards Control Unit's (HHCU) policy regarding refund of permit fees?** If a contractor submits an Asbestos Permit Application and Notification for Demolition/Renovation Form and the appropriate permit fees for a project, and the project is subsequently canceled, the contractor may request a refund of the permit fees minus a $200 administrative fee. The contractor may not receive a credit for the permit fees in order to apply them to a subsequent project. (02/08/95)(Revised 08/96)

37. **When additional regulated asbestos containing materials are identified for removal during an asbestos removal project, do the additional fees have to be reported on a Revision for Permit/Notification Form (HHCU 3768-R)?** Yes. For revisions that add to the amounts of material to be removed, appropriate permit fees for the additional material must be included with the revision, regardless of the amount of material being added to the project. The fees should be calculated using the fee schedule included on the Revision for Permit/Notification Form (HHCU 3768-R). (02/08/95) (Revised 10/96)

38. **What happens if I submit fees to the Health Hazards Control Unit and my check is returned from the bank because of insufficient funds in my account?** You will be charged a $25.00 processing fee and, thereafter, payment will have to be in the form of a money order or a certified check. (02/14/95) (Revised 10/96, 7/12)

39. **Are fees required for the removal of regulated asbestos containing materials in buildings scheduled for demolition?** Fees for the removal of greater than 160 square feet, 260 linear feet, and 35 cubic feet of regulated asbestos containing material are required for buildings scheduled to be demolished. However, the fees shall not exceed $1,500.00. For asbestos removals where the fees would have normally exceeded $1,500.00, an original letter from the owner documenting that the building is scheduled for demolition needs to accompany the permit. The letter should be addressed to the HHCU and should state when the building will be demolished. Notification requirements for the demolition of the building are still applicable. If permit application and demolition notification are made on the same form, no letter is required. Demolition means razing a building or structure, or portion thereof, to the ground. (10/96; 9/09)

AIR MONITORING AND FINAL AIR CLEARANCE

40. What are the responsibilities of the supervising air monitor? A supervising air monitor is responsible for the following activities associated with an asbestos removal:

1. Preparing and implementing a written abatement project monitoring plan for removals.

2. Directing, coordinating and approving all activities of air monitors working under his/her supervision.

3. Ensuring that ambient air sampling results shall be on site.

4. Personally inspecting individually permitted asbestos removals.

5. Preparing a written, signed and dated report documenting all site visits made to the removal project, the final visual inspection, and all ambient and clearance air sampling conducted. (02/08/95) (Revised 10/96)

41. Do the Asbestos Hazard Management Program Rules require transmission electron microscopy (TEM) analysis for clearance air sampling on non-school asbestos removals? Clearance air sampling is required for all permitted asbestos removals that are conducted in public areas. The type of analysis used will be dependent on the size of the project. TEM analysis is required for individually permitted removals of more than 3000 square, 1500 linear or 656 cubic feet of regulated asbestos containing material. TEM or phase contrast microscopy (PCM) analysis can be used for clearance air samples collected for permitted removals, less than these threshold amounts, performed in public areas. When conducting clearance air sampling, the sampling protocol used shall follow the AHERA regulations, 40 CFR 763 Subpart E. (01/22/90) (Revised 12/27/94) (Revised 10/96)

42. Is final air clearance needed or required after an asbestos removal project in a building that is going to be demolished? For individually permitted asbestos removal projects in public areas of buildings scheduled for demolition, at least phase contrast microscopy sampling and analysis shall be conducted in accordance with 40 CFR Part 763, Subpart E after the asbestos removal project is complete. (01/22/90)(Revised 12/27/94)(Revised 08/96)

43. If a permit is submitted for the removal of greater than 3000 square feet, 1500 linear feet, or 656 cubic feet of asbestos in a public area, but the material is in more than one containment area (three different areas in a building or three hundred and thirty dormitory rooms), is a design, project monitoring plan, and TEM clearance required? Projects involving the removal of greater than 3000 square, 1500 linear, or 565 cubic feet of regulated asbestos containing material from a public area must have a project monitoring plan and design. If the amount of RACM removed from a containment area is greater than 160 square feet, 260 linear feet or 35 cubic feet, TEM clearance is required. If the amount of RACM removed is less than 160 square feet, 260 linear feet or 35 cubic feet, either TEM or PCM clearance may be used. Contiguous portions of materials which are to be removed as part of the same project or at approximately the same time shall not be separated into smaller containments in order to circumvent the requirement for TEM clearance. Note: One factor to remember in calculating amounts of material to be removed is that square, linear, and cubic footage are separate categories and they are not added together to determine whether TEM clearance should be used. (02/08/95) (Revised 10/96)

44. **How should "aggressive" air sampling be performed?** Prior to air monitoring, floors, ceilings, and walls should be swept with the exhaust of a minimum one horsepower leaf blower. The EPA document, Guidance for Controlling Asbestos-Containing Materials in Buildings (EPA 560/5-85-024), recommends that this blower be used for at least 5 minutes per 1000 square feet of floor. Stationary fans should be placed in locations which will not interfere with air monitoring equipment. The fan air is directed toward the ceiling. One fan should be used for each 10,000 cubic feet of work area. Aggressive air sampling is not appropriate for dirt floor crawl spaces. (01/22/90) (Revised 02/08/95)

45. **Can a supervisor collect ambient, clearance and personal samples?** Ambient and clearance air samples are required to be collected by an accredited air monitor. Personal samples are an OSHA requirement and can be collected by the supervisor as long as the supervisor meets the definition of "competent person" in the OSHA standard. (02/12/95) (Revised 10/96)

46. **Is ambient air sampling required while an asbestos removal project is in progress?** Ambient air sampling shall be conducted in public areas adjacent to the work area for all individually permitted asbestos removal projects. Initial sampling shall be conducted on the day that regulated asbestos containing material removal begins and shall continue on a daily basis unless, or until, the supervising air monitor specifies differently. (08/96)

AHERA REINSPECTIONS

47. When must a reinspection be completed? The first reinspection should be completed within three years from the effective date of the management plan. Subsequent reinspections should be completed within three years from the date of the last reinspection. For example, if the first reinspection was conducted on July 9, 1992, then the next reinspection must be conducted on or before July 9, 1995. If there is any question on an inspection or reinspection due date for a particular school, please refer to the reinspection date specified on the AHERA Reinspection Report Form (DHHS 3778) included with the Management Plan for that school. (01/03/95) (Revised 10/96)

48. What is required for a reinspection under the AHERA regulations? The AHERA regulations under 40 CFR 763.85(b) specify the methodology which is to be used during the reinspection. The reinspection is to be performed by a North Carolina accredited inspector. In each area of a school building, the inspector must:

1. Visually reinspect and assess all friable known or assumed asbestos containing building materials (ACBM);
2. Visually inspect and touch all previously identified non-friable ACBM to determine if it has become friable;
3. Identify areas that have become friable since the last inspection; and,
4. Conduct assessment of all ACBM.
5. If bulk samples are to be collected for an area of previously assumed ACBM, then sampling should be conducted in accordance with AHERA regulations.

Within thirty (30) days after the reinspection, the inspector is required to submit reinspection information to the LEA for inclusion in the Management Plan. This information includes:

1. Reinspection date, North Carolina accreditation number, name and signature of the inspector, and any changes in the condition of known or assumed ACBM.
2. Information concerning any samples collected during the reinspection, including a description of the manner used to determine sampling locations, the name and signature of the accredited inspector who collected the samples, and the inspector's North Carolina accreditation number.
3. Reports of any assessment of friable or non-friable ACBM.

In addition to the information above, the LEA must have a North Carolina accredited management planner provide response action recommendations for homogeneous areas of ACBM that have been reclassified. These must be in line with assessment classifications as specified in the AHERA regulations.

Each LEA should determine if additional activities are required during reinspection. A few of the possibilities are as follows:

1. Identify homogeneous areas of suspect ACBM that are not currently included in their management plan.
2. Collect additional bulk samples to substantiate whether a suspect ACBM is in fact ACBM. The LEA may consider collecting multiple samples of suspect non-friable ACBM. Recent guidance from EPA recommends that sample analysis of floor tiles should be conducted by Transmission Electron Microscopy (TEM).

3. Review the response action recommendations and schedule to ensure that they are appropriate for current conditions. This may also ensure that the LEA is not locked into an unreasonable or unjustified time frame.

4. Conduct a complete audit of all recordkeeping and documentation. This would include a review of abatement project records and training (Awareness and O&M) that had been conducted in the previous three years. (08/01/91) (Revised -01/03/95) (Revised 10/96)

49. **What must be submitted to the State?** All information required to be documented under the AHERA regulations for reinspections are to be reported on the following state forms:

- AHERA Management Plan Cover Sheet (DHHS 3531)
- AHERA Reinspection Report (DHHS 3778)
- AHERA Reinspection Report Comments (DHHS 3779)

Copies of these forms are available upon request from this office. The reinspection reports are to be submitted to the HHCU within 120 days of the actual on-site reinspection. (05/31/91) (Revised 03/09/95)(Revised 08/96)

GENERAL QUESTIONS

50. How are public areas defined under the Asbestos Hazard Management Program (AHMP) Rules? According to NC General Statute 130A, public areas are those areas in any building other than a residence that are not covered under OSHA. Further, in the AHMP Rules, a public area is defined as any area to which access by the general public is not usually prohibited, or is not usually limited to access by escort only. A residence is any single family dwelling or any multifamily dwelling of fewer than 10 units. Examples of public areas may include offices, malls, theaters, restaurants, hotels, motels, dormitories, hospitals, state owned buildings, federal, city, or county buildings, and other areas in commercial and industrial establishments which are open for access by the public. (01/05/95)(Revised 08/96)

51. Are North Carolina's Asbestos Hazard Management Program Rules applicable on Federal property? Yes. All of North Carolina's Asbestos Hazard Management Program Rules are applicable to Federal property, including permitting, fees, and accreditation requirements. (04/01/91) (Revised 05/31/91)

52. What materials must be maintained on site during an asbestos removal? The following shall be maintained on site during asbestos removals and be immediately available for review by the Program:

(1) a copy of the asbestos removal permit issued by the Program and copies of all revisions with the Program's confirmation of receipt;

(2) a copy of applicable asbestos abatement design and project monitoring plan;

(3) photo identification cards issued by the Program for all accredited personnel performing asbestos management activities. (Note: Photocopies of the identification cards are unacceptable); and

(4) ambient air sampling results. (02/8/95)

53. Who gives permission to remove asbestos dry? The person requesting approval for dry removal must submit a written application along with all pertinent data justifying the need for dry removal to the Health Hazards Control Unit (HHCU). However, in the three (3) counties with Local Air Pollution Control Programs (Buncombe, Forsyth, and Mecklenburg), a written application for dry removal should be submitted to the local Asbestos Coordinator. (04/01/91) (Revised -5/31/91) (Revised -1/1/95)(Revised 08/96)

54. Is the removal of asbestos-containing floor tile regulated by the Asbestos Hazard Management Program Rules? As long as asbestos-containing floor tile is removed substantially intact - no small fragments or dust generated - it is not considered regulated asbestos-containing material. Removal of non-regulated asbestos-containing material does not require the use of accredited asbestos abatement personnel or an asbestos removal permit. If the asbestos containing floor tile is not removed substantially intact, then it is considered a regulated material and all accreditation and permitting/notification requirements apply. (01/04/95).

55. Is the removal of asbestos-containing siding regulated by the Asbestos Hazard Management Program Rules? If this material is in good condition and can be removed substantially intact - no small fragments or dust generated - then it is not considered regulated asbestos-containing material and does not require the use of accredited personnel or an asbestos removal permit. Minor breakage that may occur during careful removal of the siding does not result in the material becoming regulated; however, if the siding is not removed substantially intact, and it becomes regulated then all accreditation and permitting/notification requirements apply. (1/5/95)

56. Is the removal of asbestos-containing roofing materials regulated by the Asbestos Hazard Management Program Rules?

Asbestos containing asphalt roofing products and asbestos-cement shingles would be considered Regulated Asbestos Containing Material (RACM) and therefore regulated by the Asbestos Hazard Management Program rules under the following conditions:

(1) 160 square feet of friable asbestos containing roofing material will be removed.

(a) Friable means the material, when dry, can be crumbled, pulverized, or reduced to powder. This applies to both asphalt roofing products and asbestos-cement shingles.
(b) Asphalt roofing products would be considered friable if it has deteriorated to a point that it is no longer pliable.

(2) 5580 square feet of non-friable asbestos containing asphalt roofing material, such as built up roofing, will be removed using a rotating blade cutter.

(3) 160 square feet of non-friable asbestos-cement shingles will be removed using techniques that will create friable ACM.

Minor breakage that may occur during careful removal of the shingles does not result in the material becoming regulated; however, if the shingles are not removed substantially intact, they become regulated and all accreditation and permitting/notification requirements apply.
(01/05/95) (Revised10/96)

57. Is the removal of asbestos containing materials regulated by other Agencies? Yes. The asbestos regulations under the Occupational Safety and Health Act (OSHA) and North Carolina Solid Waste Laws are also applicable to asbestos removal projects. While the EPA's regulations and AHMP Rules may not be applicable to non-regulated ACM removals, OSHA and Solid Waste requirements may be. For additional details on the OSHA requirements, you may contact:

Education and Training Bureau
North Carolina Department of Labor
Occupational Safety and Health Division
(919) 807-2875.

For details on disposal requirements, contact the local landfill in your area prior to removal.

Also, there are three local programs in North Carolina responsible for enforcing the NESHAP regulations within their counties. The local programs are as follows:

Buncombe County
WNC Regional Air Pollution Control Agency
125 South Lexington Avenue, Suite 101
Asheville, North Carolina 28806
Telephone: 828-250-6777

Forsyth County
Environmental Assistance & Protection
Forsyth County Government Center
201 N. Chestnut Street, 5th Floor
Winston-Salem, North Carolina 27101
Telephone: 336-703-2440

Mecklenburg County
Land Use and Environmental Services Agency—Air Quality
2145 Suttle Avenue
Charlotte, North Carolina 28208
Telephone: 704-336-5430

(01/05/95)(Revised: 8/96; 8/05; 7/07; 3/11, 9/11, 7/12, 09/16)

58. What type of enforcement actions can be undertaken by the Health Hazards Control Unit for violations of the Asbestos Hazard Management Program Rules?

Asbestos Hazard Management Program Rules

Accreditations and asbestos removal permits may be suspended or revoked for any action that creates a public health hazard. Accreditations and asbestos removal permits may also be suspended or revoked if it is determined that they were issued based upon incorrect or inadequate information which materially affected the decision to issue the accreditation or asbestos removal permit. In addition, administrative penalties of up to $1,000 per day per violation may be assessed.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

N.C.G.S. 130A-22 allows assessment of administrative penalties of up to $10,000 per day per violation against persons who violate the asbestos NESHAP for demolitions and renovations.

Other Remedies

Other remedies available to the State for violations of Program Rules and NESHAP include injunctive relief and criminal misdemeanor. (04/01/90) (Revised 05/31/91) (Revised 01/01/95)

59. When does an asbestos removal project in a public area require a design, project monitoring plan, and TEM clearance?

If the total combined square footage, linear footage or cubic footage of regulated asbestos-containing materials being removed exceeds 3000 square feet, 1500 linear feet or 656 cubic feet, a design and project monitoring plan are required. Square, linear, and cubic footages are separate categories and they are not added together to determine if a design or project monitoring plan is required. TEM clearance requirements are discussed in Question 43. (09/01/2009)

HEALTH HAZARDS CONTROL UNIT
NCDHHS - DIVISION OF PUBLIC HEALTH

**** READ INSTRUCTIONS THOROUGHLY PRIOR TO COMPLETION****

ASBESTOS PERMIT APPLICATION AND NOTIFICATION FOR DEMOLITION/RENOVATION

Permit Number	NESHAP ID Number

1. TYPE: [ ] Asbestos Removal ; [ ] Emergency Asbestos Removal ; [ ] Nonscheduled Asbestos Removal ; [ ] Demo ; [ ] Ordered Demo

2. IS ASBESTOS PRESENT? [ ] Yes; [ ] No

3. FACILITY INFORMATION (Identify Owner, asbestos removal contractor, demo contractor, air monitor, designer)

OWNER NAME:

Address:

City:	State:	Zip:

Contact:	Contact Phone:

OPERATOR NAME (IF OTHER THAN OWNER):

Address:

City:	State:	Zip:

Contact:	Contact Phone:

ASBESTOS REMOVAL CONTRACTOR:

Address:

City:	State:	Zip:

Contact:	Contact Phone:

DEMOLITION CONTRACTOR:

Address:

City:	State:	Zip:

Contact:	Contact Phone:

SUPERVISING AIR MONITOR (If Required):	NC Accreditation Number:
ABATEMENT DESIGNER (If Required):	NC Accreditation Number:

4. FACILITY DESCRIPTION (Including building name, number and floor or room number)

Bldg. Name:	Facility Contact:

Street Address:

City:	State:	Zip:	County:

Building Size:	# of Floors:	Age in Years:
Present Use:	Prior Use:	Future Use:

Asbestos Removal Site Location (e.g., 2nd Floor East Wing):

5. SCHEDULED DATES: NONSCHEDULED ASBESTOS REMOVAL (MM/DD/YY) Start: Complete:

6. SCHEDULED DATES: ASBESTOS REMOVAL (MM/DD/YY) Start: Complete:

7. SCHEDULED DATES: DEMOLITION (MM/DD/YY) Start: Complete:

8. WORK SCHEDULE (Circle days applicable): Mon Tue Wed Thu Fri Sat Sun WORK HOURS:

FOR GOVERNMENTAL AGENCY USE ONLY

POSTMARK DATE:_____ REGION/COUNTY/CONTRACTOR/LANDFILL:_____

APPROVING SIGNATURE: _____ DATE: _____

ASBESTOS PERMIT APPLICATION AND NOTIFICATION FOR DEMOLITION/RENOVATION

9. INSPECTION INFORMATION (Include five digit NC HHCU assigned accreditation number)

Inspector Name:	NC Accreditation Number:	
Date of Inspection:	Samples Collected: [ ] Yes ; [ ] No	Samples Analyzed: [ ] PLM [ ] TEM
Materials May Be Assumed ACM for Renovation/Removal Purposes: Assumed ACM: [ ] Yes ; [ ] No		

10. SCOPE OF WORK FOR ASBESTOS REMOVAL AND/OR DEMOLITION:

11. ASBESTOS REMOVAL/DEMOLITION WORK PRACTICES: (Check all that apply)

ASBESTOS REMOVAL			DEMOLITION
[ ] Containment	[ ] Remove Intact	[ ] Negative Pressure	[ ] Bulldozer/Loader
[ ] Wet Methods	[ ] Rotating Blade Roof Cutter	[ ] Dry Removal	[ ] Wrecking Ball
[ ] Strip & Removal	[ ] Mechanical Chipping	**Requires Prior Written**	[ ] Implode
[ ] Glove Bag	[ ] Component Removal	**Approval from HHCU**;	[ ] Live Burn Training **(see #11 of the attached Instructions)**
	[ ] Mechanical Buffer	**Attach copy of approval letter.**	
[ ] Other - Explain Below			

12. ASBESTOS WASTE TRANSPORTER # 1

Name:		
Address:		
City:	State:	Zip:
Contact Person:		Contact Phone:

ASBESTOS WASTE TRANSPORTER # 2

Name:		
Address:		
City:	State:	Zip:
Contact Person:		Contact Phone:

13. ASBESTOS WASTE DISPOSAL SITE

Name:		
Location:		
City:	State:	Zip:
Contact Person:		Contact Phone:

14. IF DEMOLITION ORDERED BY GOVERNMENT AGENCY, PLEASE IDENTIFY THE AGENCY BELOW: (ATTACH COPY OF ORDER)

Name:	Title:
Authority:	
Date Ordered (MM/DD/YY):	Date Demolition Ordered to Begin (MM/DD/YY):

15. I AM APPLYING FOR AN EMERGENCY RENOVATION PERMIT AND A WAIVER OF THE TEN WORKING DAY NOTIFICATION PERIOD: [ ] Yes; [ ] No
(If Yes, attach letter)

ASBESTOS PERMIT APPLICATION AND NOTIFICATION FOR DEMOLITION/RENOVATION

16. AMOUNT OF ACM NOT TO BE REMOVED (Indicate whether LF, SF, or CF)

Category I:	Category II:

17. RACM MATERIALS TO BE REMOVED AND ASSESSMENT OF FEES

TYPE OF RACM	AMOUNT X $.10 = FEE	TYPE OF RACM	AMOUNT X $.20 = FEE
Flooring/Mastic:	_____ sf x .10 = $_____	Pipe Insulation (TSI):	_____ lf x .20 = $_____
Ceiling Tile:	_____ sf x .10 = $_____	Boiler Insulation (TSI):	_____ sf x .20 = $_____
Cementitious - Roofing/Siding/Panels:	_____ sf x .10 = $_____	Surfacing Material:	_____ sf x .20 = $_____
Roofing:	_____ sf x .10 = $_____	Other:	_____ sf/cf x .20 = $_____
Other: (e.g., drywall/joint compound Wallboard System)	_____ sf/cf x .10 = $_____		
TOTAL (A)	_____ sf x .10 = $_____	TOTAL (B)	_____ lf/sf/cf x .20 = $_____

18. TOTAL LF TO BE REMOVED:	TOTAL SF TO BE REMOVED:	TOTAL CF TO BE REMOVED:

19. FEES DUE

(a) TOTAL # 17(A) + # 17 (B) = $

(b) ASBESTOS REMOVAL CONTRACT PRICE = $ _____ X .01 (1%) = $

TOTAL FEES FOR ASBESTOS REMOVALS PRIOR TO DEMOLITION SHALL NOT EXCEED $1,500.00. CHECK HERE, IF APPLICABLE [ ]

RESIDING HOMEOWNERS ARE EXEMPT FROM PERMIT FEES. CHECK HERE, IF APPLICABLE [ ]

(c) TOTAL FEE DUE = $ _____ (*Whichever is greater, (a) or (b) above*)

20. I, AN OWNER OR OPERATOR OF THE DEMOLITION/RENOVATION ACTIVITY, HEREBY CERTIFY THAT THE INFORMATION SUBMITTED IS ACCURATE TO THE BEST OF MY KNOWLEDGE, AND THAT IN THE EVENT THAT UNEXPECTED RACM IS FOUND OR ACM BECOMES RACM, THE NORTH CAROLINA ASBESTOS HAZARD MANAGEMENT PROGRAM WILL BE NOTIFIED. I FURTHER CERTIFY THAT THIS PROJECT WILL BE CONDUCTED IN ACCORDANCE WITH 40 CFR PART 61, SUBPART M (NESHAP) AND 10A NCAC 41C SECTION .0600 (NC ASBESTOS HAZARD MANAGEMENT PROGRAM RULES).

NAME:_____TITLE:_____

COMPANY NAME:_____

STREET ADDRESS:_____CITY:_____STATE:_____ZIP:_____

PO BOX:_____CITY:_____STATE:_____ZIP:_____

ORIGINAL SIGNATURE:_____DATE:_____

NOTE: Please complete with mailing address. The completed/approved permit/notification will be mailed to the signatory of this block at the mailing address indicated.

THE US ENVIRONMENTAL PROTECTION AGENCY HAS DELEGATED NESHAP ADMINISTRATIVE AND ENFORCEMENT RESPONSIBILITY TO LOCAL ENVIRONMENTAL AGENCIES IN THE FOLLOWING NORTH CAROLINA COUNTIES: BUNCOMBE, FORSYTH, AND MECKLENBURG. FOR FURTHER INFORMATION REGARDING LOCAL REQUIREMENTS, PLEASE CONTACT:

Buncombe County
WNC Regional Air Pollution
Control Agency
125 Lexington Ave., Suite 101
Asheville, NC 28801
828/250-6777

Forsyth County Environmental
Affairs Department
537 North Spruce Street
Winston-Salem, NC 27101
336/703-2440

Mecklenburg County Land Use and
Environmental Services Agency—Air Quality
2145 Suttle Avenue
Charlotte, NC 28208
704/336-5430

PLEASE SUBMIT PROPERLY COMPLETED APPLICATION FORM WITH APPLICABLE PERMIT FEES TO THE FOLLOWING ADDRESS**:**

FOR US MAIL DELIVERY:
HEALTH HAZARDS CONTROL UNIT
NCDHHS-DIVISION OF PUBLIC HEALTH
1912 MAIL SERVICE CENTER
RALEIGH, NC 27699-1912
TELEPHONE: 919-707-5950

FOR EXPRESS DELIVERY SERVICES OTHER THAN US MAIL:
5505 SIX FORKS ROAD, 2nd FLOOR, Room D-1
RALEIGH NC 27609

INSTRUCTIONS

ASBESTOS PERMIT APPLICATION AND NOTIFICATION FOR DEMOLITION/RENOVATION (FORM DHHS 3768 – Revised 4/16)

PURPOSE: This form serves as an application for an asbestos removal permit (10A NCAC 41C .0600) and as a National Emission Standard for Hazardous Air Pollutants (NESHAP) notification of demolition and/or renovation in the state of North Carolina. An approved permit is required to be displayed on site for all asbestos removals of more than 35 cubic feet, 160 square feet or 260 linear feet of regulated asbestos containing material or asbestos containing material that may become regulated during handling.

PREPARATION: **All information pertinent to the removal, renovation and/or demolition must be completed** by the building owner/operator or designee and submitted with applicable permit fees to:

FOR US MAIL DELIVERY:
Health Hazards Control Unit
NCDHHS-Division of Public Health
1912 Mail Service Center
Raleigh, NC 27699-1912

FOR EXPRESS DELIVERY SERVICES OTHER THAN US MAIL:
5505 Six Forks Road, 2nd Floor, Room D-1
Raleigh, NC 27609

1. **TYPE:** Indicate the type of notification, i.e., Asbestos Removal, Emergency Asbestos Removal, Nonscheduled Asbestos Removal, Demolition, Ordered Demolition

2. **IS ASBESTOS PRESENT:** Indicate whether asbestos is present by checking Yes or No.

3. **FACILITY INFORMATION:** Enter the name of the owner of the facility, the owner's mailing address including box number, street, city, state, zip code, contact person, and telephone number of contact person.

Operator will include those acting as agent for or representatives of the owner of the facility, such as property manager, architect, general contractor, or engineering or consulting firm. Complete the name of the operator and the operator's mailing address including box number, street, city, state, zip code, contact person and the contact person's telephone number.

If regulated asbestos containing materials (RACM) are to be removed, complete the name of the asbestos removal contractor, the contractor's mailing address including box number, street, city, state, zip code, contact person and telephone number for contact person.

Where demolition of the facility immediately follows the removal of RACM, complete the demolition contractor's name, the demolition contractor's mailing address including box number, street, city, state, zip code, contact person and telephone number for contact person.

When no asbestos removal is required prior to demolition, complete the owner, operator, and demolition contractor information as appropriate.

Supervising Air Monitor: Enter the name of the NC accredited supervising air monitor and the supervising air monitor's NC accreditation number if applicable.

Abatement Designer: Required for all individually permitted asbestos removals conducted in public areas consisting of more than 3000 square feet (281 square meters), 1500 linear feet (462 meters), or 656 cubic feet (18 cubic meters) of RACM.

4. **FACILITY DESCRIPTION:** Complete the building name of the facility to be renovated or demolished, the physical address including street number, street name, city, state, and county. Asbestos removal site location should include the building number, floor number and room number(s). Complete building size in square feet, number of floors in building, the age of the building, and its present use, prior use, and future use.

5. **SCHEDULED DATES - NONSCHEDULED ASBESTOS REMOVAL:** A nonscheduled Asbestos Removal is an asbestos removal required at any installation by the routine failure of equipment, which is expected to occur within a calendar year (Jan. 1 - Dec. 31). The amounts of RACM to be removed during this period are expected to exceed 35 cubic feet, 160 square feet, or 260 linear feet. **This notification is required to be submitted at least 10 working days prior to the new calendar year.**

6. **SCHEDULED DATES - ASBESTOS REMOVAL:** Complete the asbestos removal start date and the asbestos removal complete date. Start date means the date on which activities on a permitted asbestos removal requiring the use of accredited workers and supervisors begin, including removal area isolation and preparation or any other activity which may disturb asbestos containing materials. **This notification is required to be submitted at least 10 working days prior to the start date.**

7. **SCHEDULED DATES - DEMOLITION:** Complete the demolition start date and the demolition complete date. See definition of "Start Date" in #6 above. **This notification is required to be submitted at least 10 working days prior to the start date**.

8. **WORK SCHEDULE:** Circle all days when asbestos removal activities are to occur. Enter the working hours that asbestos removal activities will be conducted (i.e., 7:30 AM - 5:00 PM).

9. **INSPECTION INFORMATION:** Enter the North Carolina accredited inspector's name and North Carolina accreditation number. This information is required for demolitions. Enter date(s) the inspection was conducted; indicate yes or no for Samples Collected; if Samples Collected is yes, then indicate the analytical method used to analyze the samples. Materials may be assumed to be RACM in lieu of an inspection for purposes of asbestos removals.

10. **SCOPE OF WORK FOR ASBESTOS REMOVAL AND/OR DEMOLITION:** Enter a brief description of the asbestos removal and/or demolition (i.e., remove 300 lf of pipe insulation from crawl space. Demolish cafeteria building using heavy equipment).

11. **ASBESTOS REMOVAL/DEMOLITION WORK PRACTICES:** Check all appropriate boxes. Provide a complete explanation of work practices to be followed if "other" is checked. NOTE: Dry removal requires prior written approval from the HHCU. Attach copy of approval letter to completed application.
FOR LIVE FIRE BURNS ONLY: If the building is to be demolished by burning, you must also contact the NC Department of Environment and Natural Resources, Division of Air Quality (DAQ) for information on additional DAQ notification requirements. Please contact your DAQ regional office for more information (phone numbers are listed at http://daq.state.nc.us/about/regional) or call 919-733-1477.

12. **ASBESTOS WASTE TRANSPORTER #1:** Complete the name, mailing address, including city, state, zip code, contact person and contact person's telephone number for the waste transporter contracted to transport the waste to an approved landfill.

ASBESTOS WASTE TRANSPORTER #2: Complete the name, mailing address, including city, state, zip code, contact person and the contact person's telephone number for the waste transporter contracted in conjunction with or separately from Waste Transporter #1.

13. **ASBESTOS WASTE DISPOSAL SITE:** Complete the name and location of the waste disposal site where the asbestos containing waste will be disposed including the street, route, or highway of the waste facility, city, state, zip code, contact person at the waste disposal site, and contact person's telephone number.

14. **IF DEMOLITION ORDERED BY GOVERNMENT AGENCY:** Complete the name, title, authority, the date of the order and the date the demolition is ordered to begin. Attach a copy of the order to the completed permit application/notification.

15. **APPLYING FOR AN EMERGENCY RENOVATION PERMIT:** Attach a letter from the owner or operator stating the date and hour the emergency occurred. Describe the sudden, unexpected event resulting in the emergency. Explain how the event caused unsafe conditions or would cause equipment damage or an unreasonable financial burden.

16. **AMOUNT OF ACM NOT TO BE REMOVED:** Enter the amounts of ACM in the affected part of the facility that will not be removed.

17. **RACM MATERIALS TO BE REMOVED AND ASSESSMENT OF FEES:** Complete the corresponding blanks with the amounts of Regulated Asbestos Containing Material(s) (RACM) being removed at the site. When RACM to be removed is greater than 35 cubic feet, 160 square feet and/or 260 linear feet, compute the fees as outlined on the form. Complete totals (A) and (B).

To calculate fees for joint compound used in sheetrock/drywall wallboard systems, use 10% of the total square footage of sheetrock/drywall to be removed (example: 1600 Total SF of wall x .10 = 160 x $0.10/SF = $16.00 in fees).

To calculate fees for RACM Category I roofing cut by a rotating blade cutter, divide the total square footage of the roof by 5,580. Multiply this number by 160. The resulting number is then multiplied by $.10 to get the total permit fee. (example: Roof Area 22,320 square feet / 5,580 = 4 x 160 x $0.10 = $64.00 fees).

18. **TOTAL LF/SF/CF TO BE REMOVED:** Enter the total linear feet, total square feet, and total cubic feet from #17. For drywall/joint compound wallboard systems or Category I roofing materials enter the total SF of material to be removed, not the amount used to calculate the fee.

19. **FEES DUE:** (a) Total #17.(A) + Total #17.(B) and enter amount. (b) Enter asbestos removal contract price and multiply by 0.01 (1%) and enter total. Enter total fee due, whichever is greater, (a) or (b). NOTE: The maximum fee due for asbestos removal prior to demolition is $1,500.00. Residing Homeowners are exempt from permit fees.

20. **CERTIFICATION:** Enter all information requested. **Only notifications completed in permanent media with original signature will be considered.**

NOTE: All owners and operators are responsible for the information on the permit/notification.

Checks should be made payable to: NCDHHS - Health Hazards Control Unit

Upon approval of the Application/Notification, an HHCU Permit Number will be assigned to the removal project and a one-page project Permit will be returned to the applicant. The project Permit/Notification and all revisions must be on-site and available for review throughout the duration of the project.

For Additional Forms and Information

Please contact the Health Hazards Control Unit at 919-707-5950 ***OR*** go to our website at: **http://epi.publichealth.nc.gov/asbestos/ahmp.html**

HEALTH HAZARDS CONTROL UNIT
NC DHHS--DIVISION OF PUBLIC HEALTH
1912 MAIL SERVICE CENTER, RALEIGH, NC 27699-1912
TELEPHONE: 919-707-5950 FAX: 919-870-4808

REVISION FOR PERMIT/NOTIFICATION

Revisions are NOT approved upon receipt. Revision Forms will be reviewed and if additional information, changes or corrections are needed, the contact person will be notified.

PERMIT NUMBER:	**NESHAP NUMBER:**
FACILITY:	**FACILITY ADDRESS:**
CONTRACTOR:	**CONTACT PHONE:**
CONTACT PERSON:	**CONTACT FAX NUMBER:**

ASBESTOS REMOVAL DATES

ORIGINAL REMOVAL START DATE:	**REVISED REMOVAL START DATE:**
ORIGINAL REMOVAL COMPLETE DATE:	**REVISED REMOVAL COMPLETE DATE:**

DEMOLITION DATES

ORIGINAL DEMO START DATE:	**REVISED DEMO START DATE:**
ORIGINAL DEMO COMPLETE DATE:	**REVISED DEMO COMPLETE DATE:**

ADDITIONAL AMOUNTS OF MATERIALS/FEES

TYPE OF RACM	AMOUNT X $ 0.10 = FEE	TYPE OF RACM	AMOUNT X $ 0.20 = FEE
Flooring/Mastic:	_____**sf x .10 = $**_____	**Pipe Insulation (TSI):**	_____**lf x .20 = S**_____
Ceiling Tile:	_____**sf x .10 = $**_____	**Boiler Insulation (TSI):**	_____**sf x .20 = S**_____
Cementitious- Roofing/Siding/Panels	_____**sf x .10 = $**_____	**Surfacing Material:**	_____**sf x .20 = S**_____
Roofing:	_____**sf x .10 = $** _____	**Other (sf/cf):**	_____**sf/cf x .20 = $** _____
Other: _____ **sf/cf x .10 = $**_____ **(e.g., drywall/joint compound Wallboard System**			
TOTAL (A)_____ **x .10 = $**_____		**TOTAL (B)** _____ lf/sf/cf **x .20 = $**_____	

(a) TOTAL (A) + (B) = $ _____	**(b) CONTRACT PRICE = $**_____ **x .01 = $**_____

TOTAL ADDITIONAL FEE PAID (Whichever is greater, (a) or (b) above): $ _____

ADDITIONAL COMMENTS OR OTHER REVISIONS:

I CERTIFY THAT THE INFORMATION SUBMITTED IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

NAME:_____ **TITLE:** _____

COMPANY NAME: _____

SIGNATURE: _____ **DATE:** _____

*** HEALTH HAZARDS CONTROL UNIT USE ***

RECEIVED BY: _____ **DATE RECEIVED:** _____

POSTMARK DATE: _____ **PERMITS DATA ENTRY:** _____

FAX TRANSMITTAL INFORMATION

TO: _____ **DATE:** _____	**TO:** _____**HHCU**_____ **DATE:** _____
FROM: _____ **TIME:** _____	**FROM:** _____ **TIME:** _____
FAX # : _____ **# PAGES:** _____	**FAX #:** _____**919-870-4808**_____ **PAGES:** _____

HEALTH HAZARDS CONTROL UNIT
NC DHHS--DIVISION OF PUBLIC HEALTH
1912 MAIL SERVICE CENTER, RALEIGH, NC 27699-1912
TELEPHONE: 919-707-5950 FAX: 919-870-4808

INSTRUCTIONS
REVISION FOR PERMIT/NOTIFICATION
(HHCU 3768-R)

PURPOSE: **This form shall be used for the required reporting of revisions to any active NC Permit for asbestos removal and/or NC demolition notification.**

PREPARATION: **This form shall be completed when any revisions occur for scheduled start and/or complete dates for asbestos removals and/or demolitions; when additional amounts of regulated asbestos-containing materials (RACM) are to be removed; and for other revisions that substantially alter the originally approved permit or notification.**

INSTRUCTIONS: **Enter the assigned NC Permit Number and/or NESHAP ID Number of the approved permit or notification to be revised.**

Complete the facility name and address; contractor's name and address; contact person's name and contact person's telephone number.

Indicate any revisions in start and/or complete date(s) as indicated—being sure to indicate properly whether it is a removal date revision or a demolition date revision.

If the amounts of RACM being removed are to be revised, enter the ADDITIONAL amounts in the corresponding blanks and compute the additional fees accordingly.

Type in or print legibly the certifying individual's name, title, and company name. The certifying individual must sign and date the form as indicated.

FAX TRANSMITTAL INFORMATION: The HHCU accepts telefaxed revisions. Fax revisions to 919-870-4808. Telefaxed revisions received by the HHCU are initialed, dated, and faxed back to the individual who signed the Revision Form. It is the contact person's responsibility to assure the faxed revision is received, signed, and faxed back to confirm receipt. Revisions are NOT approved upon receipt. Upon review of the Revision Form, if additional information, changes or corrections are needed, the contact person will be notified.

GUIDELINES: **If a removal and/or demolition is to begin earlier than the original start date, the Revision shall be received by the HHCU at least 10 working days before the new start date.**

Removals and/or demolitions may be placed in "on hold" status; however, the work must be conducted within 12 months from the original start date. If not, the original permit or notification is automatically canceled. The owner or his representative must submit a revision giving the new start and complete dates prior to resuming work on the project.

For revisions with additional amounts of RACM to be removed, the revision should include the Abatement Designer and Supervising Air Monitor if the total RACM to be removed exceeds 3,000 SF, 1,500 LF, or 656 CF in a public area. An additional contract price should be included when additional amounts are added, unless removal is being conducted by in-house personnel.

To calculate fees for joint compound used in sheetrock/drywall wallboard systems, use 10% of the total square footage of sheetrock/drywall to be removed (example: 1600 Total SF of wall x .10 = 160 x $0.10/SF = $16.00 in fees).

To calculate fees for RACM Category I roofing cut by a rotating blade cutter, divide the total square footage of the roof by 5,580. Multiply this number by 160. The resulting number is then multiplied by $.10 to get the total permit fee. (example: Roof Area 22,320 square feet / 5,580 = 4 x 160 x $0.10 = $64.00 fees).

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
HEALTH HAZARDS CONTROL UNIT

TYPE OR USE BALLPOINT PEN
PRESS FIRMLY - ALL COPIES
MUST BE LEGIBLE

NORTH CAROLINA ASBESTOS WASTE SHIPMENT RECORD

1. Waste Generator/Owner Name and Address:	Work Site Name and Physical Address:	Waste Generator/Owner Phone Number: (_____)_____
2. Contractor Name and Address:		Contractor Phone Number: (_____)_____
3. Waste Disposal Site (WDS) Name, Mailing Address:	WDS Physical Site Location: NC Landfill Permit #:	WDS Phone Number: (_____)_____

4. Name of Responsible Agency:

[ ] Forsyth Co. Environmental Affairs Dept.
[ ] Mecklenburg Co. Land Use & Env. Svs. Ag.- Air Quality
[ ] NC DHHS - Health Hazards Control Unit
[ ] WNC Regional Air Pollution Control Agency

Permit #:_____ NESHAP (ACTS) ID #:_____

Start Date:_____ Completion Date:_____

5. Description of materials:

6. Containers Number:_____ Type:_____ Vehicle:_____ _____	NA2212, ASBESTOS, 9, III, RQ	7. Total Quantity (yd^3)m^3:

8. Special Handling Instructions and Additional information:

EMERGENCY CONTACT: DIVISION OF EMERGENCY MANAGEMENT (1-800-858-0368)

9. **CONTRACTORS CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packaged, marked, and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national government regulations.**

Printed/Typed Name & Title:_____

Signature:_____ **Date (MM/DD/YY):**_____

10. Transporter 1 (Acknowledgment of Receipt of Materials):

Printed/Typed Name & Title:_____

Address:_____ **Phone Number:**_____

Signature:_____ **Date (MM/DD/YY):**_____

11. Transporter 2 (Acknowledgment of Receipt of Materials):

Printed/Typed Name & Title:_____

Address:_____ **Phone Number:**_____

Signature:_____ **Date (MM/DD/YY):**_____

12. Discrepancy Indication Space:

13. Waste Disposal Site: **Owner or Operator Certification of Receipt of Asbestos Materials Covered by this Manifest, Except as Noted in Item #12.**

Printed/Typed Name & Title:_____ **Total Weight (Tons):**_____

Signature:_____ **Date (MM/DD/YY):**_____

(1 copy- Waste Generator/Owner; 1 copy- Contractor; 1 copy - Transporter; 1 copy -Disposal Site; 1 copy - Health Hazards Control Unit)

Asbestos Accreditation Application ****PLEASE TYPE OR PRINT IN INK****

APPLICANT'S NAME: _____ **IF RENEWAL** – ACCREDITATION NUMBER: _____
(FIRST, MIDDLE INITIAL, LAST)

APPLICANT'S HOME ADDRESS (The way it is to appear on identification card):

ADDRESS: _____ CITY: _____ STATE: ____ ZIPCODE: _____

PHONE: _____ DATE OF BIRTH: _____ SEX: _____ HEIGHT: _____ WEIGHT: _____
(MM/DD/YY) (M/F)

EMAIL ADDRESS: _____

DISCIPLINE FOR WHICH YOU WISH TO BE ACCREDITED (Check ONLY one discipline, a separate application form is required *for each discipline*):

☐ Worker ☐ Supervisor ☐ Inspector ☐ Mgmt. Planner ☐ Designer
☐ Air Monitor ☐ Supervising Air Monitor ☐ Roofing Supervisor ☐ Roofing Worker

---

ACCREDITATION FEE (Check ONLY One):

☐ $25.00 Worker
☐ $25.00 Roofing Worker
☐ Duplicate ID Card, all disciplines – $10.00

ALL OTHER DISCIPLINES:

☐ $100.00 First/Only Accreditation in Calendar Year (Jan. 1– Dec. 31)
☐ $75.00 Additional Accreditation in Same Calendar Year (Jan. 1– Dec. 31)

EMPLOYER'S NAME: _____

EMPLOYER'S ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

EMPLOYER'S PHONE NUMBER: _____ EMPLOYER'S FAX NUMBER: _____

TRAINING PROVIDER: _____ DATE(S) ATTENDED: _____

NAME OF COURSE COMPLETED: _____

OATH

I hereby acknowledge that I have read and understand this application and hereby swear or affirm that the contents of this application are true and correct to the best of my belief and knowledge. I acknowledge that any accreditation issued pursuant to this application will be subject to revocation if issuance was based on incorrect or inadequate information that materially affected the decision to issue the accreditation (N.C. Gen. Stat. § 130A-23).

APPLICANT'S ORIGINAL SIGNATURE: _____ **Date**: _____

****DO NOT WRITE BELOW THIS LINE -- FOR DEPARTMENT USE ONLY****

ACCREDITATION NUMBER: _____ EXPIRATION DATE: _____

CHECK/M.O. NUMBER: _____ AMOUNT PAID: _____

APPROVING SIGNATURE: _____ DATE: _____

USPS Mailing Address:
Health Hazards Control Unit
NCDHHS – Division of Public Health
1912 Mail Service Center
Raleigh, NC 27699-1912

Express Delivery Address:
Health Hazards Control Unit
NCDHHS – Division of Public Health
5505 Six Forks Road, 2nd Floor, Room D-1
Raleigh, NC 27609

INSTRUCTIONS

For Completion of DHHS 3699 – Asbestos Accreditation Application

PURPOSE

Application for North Carolina Accreditation shall be submitted in order to receive a North Carolina accreditation number and photo identification card for inspector, management planner, supervisor, abatement designer, supervising air monitor, air monitor, worker, roofing worker and roofing supervisor per 10A NCAC 41C Section .0600, Asbestos Hazard Management Program Rules.

Contact the HHCU immediately if your NC accreditation photo-identification card is lost or stolen.

PREPARATION

All information is to be completed by applicant and **must be filled out completely**, typed or printed in ink. Pencil is not acceptable.

INSTRUCTIONS

Enter your full name, address, city, state, and zip code as you want it to appear on your photo identification card. Indicate accreditation number if applying for renewal accreditation. Enter an email address if applicable. Telephone number should be complete with area code. Enter your date of birth (month/day/year), sex (male/female), height (feet and inches) and weight (pounds). The North Carolina Department of Labor, Wage and Hour Act considers work involving asbestos hazardous to the health of youths. Accreditations shall not be issued to individuals who are not at least eighteen (18) years of age. Each applicant must submit his/her correct birth date on the accreditation application.

Indicate the discipline for which you wish to be accredited **(mark only one discipline per application)**.

Initial accreditation fee is $100.00 for all categories, except the fee for individuals applying for accreditation or reaccreditation as worker or roofing worker is $25.00. If an individual applies for accreditation or reaccreditation in more than one category per calendar year, the amount of the fee shall be $100.00 for accreditation or reaccreditation in the first category and $75.00 for accreditation or reaccreditation in each remaining category. The fee for a duplicate accreditation card is $10.00. If your NC accreditation photo-identification card is lost or stolen, contact the HHCU immediately.

Indicate Employer's name, mailing address, city, state, zip code and telephone phone number complete with area code. **All return correspondence will be sent via First Class Mail to the employer's address provided unless otherwise requested by the applicant**.

Indicate the name of the Training Provider and the name of the course successfully completed that corresponds with the accreditation request. Indicate the dates the course was attended. Training provider information must be entered on the application before the application is considered complete. Please note: the HHCU does **not** accept any online, virtual, or hybrid initial or refresher asbestos training for accreditation purposes.

Read the OATH carefully. If any forged certificate or misinformation is found to exist, the individual may be subject to revocation of accreditation. The application shall be signed and dated by you, the applicant. An original hand-written or electronic signature is required on the application. No faxes will be accepted.

ADDITIONAL EDUCATION AND EXPERIENCE REQUIREMENTS

Per 10A NCAC 41C .0602, an applicant for initial accreditation shall have successfully completed an approved initial training course for the specific category within the 12 months immediately preceding application, or, if initial training was completed more than 12 months prior to application, the applicant shall have successfully completed an approved refresher training course for the specific category at least every 24 months from the date of completion of initial training to the date of application. Accreditations expire 12 months **after the date of training**, not the date of accreditation.

A **Worker** and a **Roofing Worker** shall have successfully completed an approved training course for workers.
An **Inspector** shall have a high school diploma or equivalent and at least three months of experience as or under the direct supervision of an accredited inspector.
A **Management Planner** shall have a high school diploma or equivalent and shall be an accredited inspector.
A **Supervisor** shall have a high school diploma or equivalent – except that this requirement shall not apply to supervisors that were accredited in North Carolina on November 1, 1989, and kept that accreditation current – and at least three months of experience as or under the direct supervision of an accredited supervisor.
A **Roofing Supervisor** shall meet the requirements of a Supervisor but duties regarding asbestos are limited to Class II asbestos work involving only roofing products that are classified as regulated asbestos containing material.
An **Abatement Designer** shall have a high school diploma or equivalent and at least three months of experience as or under the direct supervision of an accredited abatement designer.

An **Air Monitor** shall work only under the supervision of a North Carolina accredited Supervising Air Monitor and shall have a high school diploma or equivalent and at least three months of experience as or under the direct supervision of an accredited air monitor. A **Supervising Air Monitor** shall have a high school diploma or equivalent and at least three months of experience as or under the direct supervision of an accredited air monitor.

For additional training requirements and professional status requirements regarding Air Monitor and Supervising Air Monitor refer to 10A NCAC 41C .0602(c)(6)(B), .0602 (c)(7)(B), and .0602 (c)(7)(C) [amended eff. January 1, 2021].

REQUIRED SUPPORTING DOCUMENTATION

Confirmation of training shall be in the form of **an original certificate** of completion from the approved training course bearing the training provider's official seal, or **an original letter from the training provider** confirming completion of the course on the training provider letterhead, or an original letter from the training provider listing names of persons who have successfully completed the training course with the applicant's name included.

If requesting initial accreditation in North Carolina after completion of refresher course(s), original documentation of successful completion of the initial training course as well as all refresher courses is required.

When a high school diploma is required, attach a copy of the diploma or other written documentation from the educational institution.

When experience is required, attach work history documenting asbestos experience; this documentation should include the project dates and number of days of experience, your specific responsibilities on each project, and the name(s) of the accredited individual(s) under whose supervision you worked.

Enclose a check or money order in the correct amount depending on the accreditation requested. The Initial accreditation fee is $100.00 for all categories, except that the fee for individuals applying for accreditation or reaccreditation as worker or roofing worker is $25.00. If an individual applies for accreditation or reaccreditation in more than one category per calendar year, the amount of the fee shall be $100.00 for accreditation or reaccreditation in the first category and $75.00 for accreditation or reaccreditation in each remaining category. Make the check or money order payable to: NC DHHS - Health Hazards Control Unit. **DO NOT SEND CASH.**

Enclose **one current photograph of the applicant per application** submitted. Photographs shall be in color and 1¼ inch x 1¼ inch in size with the applicant's name printed on the back. The HHCU will not accept photographs with headwear, sunglasses, profile, or photos in black and white. Photographs that are not **current**, i.e., photos from old licenses or a copy of last year's photo, will also **not** be accepted. Applications submitted without photographs will be returned as incomplete.

For Additional Forms and Information

Please contact the Health Hazards Control Unit at 919-707-5950 ***OR*** go to our website at:
https://www.dph.ncdhhs.gov/asbestos

The Completed Application Form with Supporting Documentation should be mailed to:

USPS MAILING ADDRESS:
Health Hazards Control Unit
NCDHHS – Division of Public Health
1912 Mail Service Center
Raleigh, North Carolina 27699-1912

EXPRESS DELIVERY ADDRESS:
Health Hazards Control Unit
NCDHHS – Division of Public Health
5505 Six Forks Road 2nd Floor Room D-1
Raleigh, North Carolina 27609

Chapter 18: Supplemental Information

Asbestos and School Buildings

Public and non-profit private schools have distinct regulatory requirements to protect school children and school employees from asbestos exposure. This page provides information on these requirements as well as resource materials for schools and parents.

- Learn Federal Requirements
  - How Schools Comply with the Asbestos Hazard Emergency Response Act (AHERA)
  - School Asbestos Management Plans
- Find Resources for Schools and Parents
- En Español, Información para parientes, maestros y otros empleados escolares

Learn Federal Requirements

The Asbestos Hazard Emergency Response Act (AHERA) <http://www.gpo.gov/fdsys/pkg/uscode-2009-title15/html/uscode-2009-title15-chap53-subchapii.htm> and its regulations require public school districts and non-profit schools including charter schools and schools affiliated with religious institutions to:

- Inspect their schools for asbestos-containing building material
- Prepare management plans and to take action to prevent or reduce asbestos hazards

These legal requirements are founded on the principle of "in-place" management of asbestos-containing material. Removal of these materials is not usually necessary unless the material is severely damaged or will be disturbed by a building demolition or

renovation project.

Personnel working on asbestos activities in schools must be trained and accredited in accordance with The Asbestos Model Accreditation Plan <http://www.gpo.gov/fdsys/pkg/cfr-2011-title40-vol31/pdf/cfr-2011-title40-vol31-part763-subparte-appc.pdf>.

In addition, if removal of asbestos during renovation is warranted, or school buildings will be demolished, public school districts and non-profit schools must comply with the Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP) <https://epa.gov/asbestos/overview-asbestos-national-emission-standards-hazardous-air-pollutants-neshap>.

Read more about NESHAP regulations for renovation and demolition of buildings <https://epa.gov/asbestos/information-owners-and-managers-buildings-contain-asbestos#renovation>.

In addition, state and local agencies may have more stringent standards than those required by the Federal government.

How Schools Comply with the Asbestos Hazard Emergency Response Act (AHERA)

The AHERA regulations <http://www.gpo.gov/fdsys/pkg/cfr-2011-title40-vol31/pdf/cfr-2011-title40-vol31-part763-subparte.pdf> require public school districts and non-profit schools to:

- Perform an original inspection to determine whether asbestos-containing materials are present and then re-inspect asbestos-containing material in each school every three years
- Develop, maintain, and update an asbestos management plan and keep a copy at the school
- Provide yearly notification to parent, teacher, and employee organizations on the availability of the school's asbestos management plan and any asbestos-related actions taken or planned in the school
- Designate a contact person to ensure the responsibilities of the public school district or the non-profit school are properly implemented

- Perform periodic surveillance of known or suspected asbestos-containing building material
- Ensure that trained and licensed professionals perform inspections and take response actions
- Provide custodial staff with asbestos-awareness training

School Asbestos Management Plans

Public school districts and non-profit schools are required to develop, maintain and update asbestos management plans and to keep a copy at each individual schools. These plans are required to document the recommended asbestos response actions, the location of the asbestos within the school, and any action taken to repair and remove the material.

The school authority must maintain records to be included in the Asbestos Management Plan. These records, among other things, include:

- Name and address of each school building and whether the building has asbestos-containing building material, and the type of asbestos-containing material
- Date of the original school inspection
- Plan for re-inspections
- Blueprint that clearly identifies the location of asbestos-containing building materials that remains in the school
- Description of any response action or preventive measures taken to reduce asbestos exposure
- Copy of the analysis of any building, and the name and address of any laboratory that sampled the material
- Name, address, and telephone number of the “designated person” or contact to ensure the duties of the school district or non-profit private school are carried out
- Description of steps taken to inform workers, teachers, and students or their legal guardians about inspections, re-inspections, response actions, and periodic surveillance

Parents, teachers, and school employees, or their representatives, have the right to inspect the school's asbestos management plan. Schools are required to notify parent-teacher organizations (such as PTAs) once a year about the availability of the school's asbestos management plan and asbestos-related activity taking place within the school. The school must make the plan available for inspection within five working days of it being requested.

For a complete list of School Asbestos Management Plan Requirements, see the Asbestos-Containing Materials in Schools Rule. <https://www.govinfo.gov/content/pkg/cfr-2011-title40-vol31/pdf/cfr-2011-title40-vol31-part763-subparte.pdf>

Find Resources for Schools and Parents

EPA Region 5 Asbestos Hazard Emergency Response Act (AHERA) Webinar Series: *How to Manage Asbestos in School Buildings*. EPA hosted a four-part webinar training series to assist schools with understanding their federal regulatory responsibilities under AHERA.

- Part 1: Introduction to Asbestos <https://youtu.be/hlimz0rpifa> (August 13, 2021)
- Part 2: How to Manage Asbestos in School Buildings: Local Education Agency and AHERA Designated Persons Requirements (August 16, 2021)
- Part 3: Inspection and Surveillance Requirements (August 26, 2021)
- Part 4: Operations and Maintenance (September 2, 2021)

Healthy School Environments: Local Education Agency Responsibilities Under the Asbestos Hazard Response Act (AHERA) <https://epa.gov/asbestos/healthy-school-environments-local-education-agency-responsibilities-under-asbestos-hazard> (August 2023)

Integrated Pest Management (IPM) and Asbestos Management for School Facilities Refresher Training <https://youtu.be/zxytobb7a1o> (January 2022)

How to Manage Asbestos in School Buildings: The AHERA Designated Person's Self Study Guide <https://epa.gov/asbestos/how-manage-asbestos-school-buildings-ahera-designated-persons-self-study-guide-0> (January 1996)

AHERA Asbestos Management Plan Self-Audit Checklist for Designated Persons <https://epa.gov/asbestos/ahera-asbestos-management-plan-self-audit-checklist-designated-persons> (February 2009)

Model AHERA Asbestos Management Plan for Local Education Agencies <https://epa.gov/asbestos/model-ahera-asbestos-management-plan-local-education-agencies> (February 2009)

The ABC's of Asbestos in Schools <https://epa.gov/asbestos/abcs-asbestos-schools> (August 2003)

Asbestos in Schools Fact Sheet <https://epa.gov/asbestos/federal-requirements-asbestos-management-schools-fact-sheet> (August 2003)

EPA's Creating Healthy Indoor Environments in Schools Website <https://epa.gov/indoor-air-quality-iaq>

What Local Education Agencies (LEAs) Should Know About the National Emission Standard for Hazardous Air Pollutants (NESHAP) <https://epa.gov/asbestos/what-local-education-agencies-leas-should-know-about-asbestos-national-emission-standard> (March 2005)

Find Labs for Testing Asbestos <https://epa.gov/asbestos/asbestos-professionals>

Find frequent questions on schools <https://epa.gov/iaq-schools/iaq-schools-frequently-asked-questions>

En Español, Información para parientes, maestros y otros empleados escolares

El ABC del Asbesto en las Escuelas <https://espanol.epa.gov/espanol/el-abc-del-asbesto-en-las-escuelas>

Plan de manejo de asbesto de AHERA, Lista de comprobación de auditoría interna para Personas designadas <https://epa.gov/asbestos/plan-de-manejo-de-asbestos-de-ahera>

Modelo AHERA para el Plan de manejo de asbesto para las Agencias locales de educación <https://epa.gov/asbestos/modelo-ahera-para-el-plan-de-manejo-de-asbestos-para-las-angencias-locales-de-educacion>

Glossary and Acronyms

GLOSSARY

The following is a list of terms that may be encountered in asbestos management:

ACBM	Asbestos-Containing Building Material. A building material that contains more than 1% asbestos, as determined by polarized light microscopy.
Amosite	Brown asbestos, brittle fibers, high resistance to heat
Amphibole	A major classification of asbestos mineral.
Asbestos	A term used to define a group of naturally occurring minerals composed of hydrated silicates crystalline in structure, occurring as parallel bundles of fibers.
Asbestosis	A scarring of the lung tissue which is a form of pulmonary fibrosis.
ASHARA	Asbestos School Hazard Abatement Reauthorization Act, which revised Appendix C of AHERA. The revision extended the training requirements for some disciplines, and extended accreditation to public and commercial buildings.
Bonding	An insurance contract to guarantee payment if a financial loss occurs as a result of an action of an employee or the contractor owner.
Bulk Sampling	Technique used to collect samples of suspect ACBM. It involves physically removing a piece of suspect ACBM and having it analyzed by Polarized Light Microscopy for presence of asbestos minerals.
Claims-Made Policy	Claims made while the policy is in force.
Class I Activity	Defined by the OSHA standard as an activity involving the removal of TSI, surfacing ACM, and PACM.
Class II Activity	Defined by the OSHA standard as an activity involving the removal of ACM, which is not TSI or surfacing material.
Class III Activity	Defined by the OSHA standard as repair and maintenance operations.
Class IV Activity	Defined by the OSHA standard as maintenance and custodial activities during which the employees contact ACM or PACM.
Crocidolite	Blue asbestos, strongest of asbestos mineral, brittle fibers.
Chrysotile	White asbestos, fine, silky fibers, flexible with high tensile strength.

Decontamination	The process of ridding one's self or equipment of unwanted or hazardous material.
Dose-Response Relationship	A principle in toxicology in which increases in the dose, or exposure, result in proportional increases in the response or effects.
Excursion Level	The OSHA standard allows an excursion level for airborne asbestos, meaning that an employee shall not be exposed to a concentration in excess of 1.0 f/cc as averaged over a 30 minute sampling time.
Fibrils	A small bundle of individual fibers.
Fit Testing	A process of testing respirator face-piece to face seal.
Friable	Asbestos that can be reduced to powder with normal hand pressure.
HEPA	High Efficiency Particulate Air, a type of air filter that is 99.97% efficient in filtering particles 0.3 um in diameter or greater.
Homogeneous Area	An area of building material of similar color and texture, as determined by the accredited inspector.
Latency Period	Length of time between exposure to a toxic substance and the onset of appearance of resultant disease. Asbestos-related diseases have relatively long latency periods.
LEA	Local Educational Agency or a public or private school board.
Liability	Legally bound or obligated.
Litigation	The act or process of carrying on a lawsuit.
Mesothelioma	A rare form of cancer of the pleural cavity or peritoneal cavity, specifically associated with asbestos exposure.
Non-Friable Asbestos	Any materials that contain more than 1% asbestos by weight and is material that is matrix-bonded and not likely to release fibers upon casual contact. This material <u>cannot</u> be reduced to powder by normal hand pressure.
O&M	Operations and Maintenance.
Occurrence Basis	Claim is made during time of policy period, or a claim can be submitted years after the policy has expired.

Owner or Operator	Any person who owns, leases, operates, controls, or supervises.
PAPR	Powered Air Purifying Respirator.
PEL	The OSHA standard for asbestos exposure allows a Permissible Exposure Limit meaning a level of airborne asbestos above which no employee shall be exposed. The PEL is 0.1 f/cc of air as an 8-hour time-weighted average (see 29 CFR 1926.1001).
Physical Assessment	Classifying ACBM or suspect ACBM according to degree of damage.
Pleural Diseases	Thickening or scarring of the pleural tissues which normally have no symptoms but are indicators of asbestos exposure.
Presumed ACM	Thermal system insulation and surfacing material found in buildings constructed no later than 1980 which have not been sampled and analyzed.
Serpentine	A major classification of asbestos mineral.
SCBA	Self-Contained Breathing Apparatus.
Synergistic Effects	The combined, or multiplicative, effect of two factors, wherein the whole is greater than the sum of its parts.
TEM	Transmission Electron Microscopy.
Visible Emissions	Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments.

ACRONYMS

ACBM	Asbestos Containing Building Materials
ACM	Asbestos Containing Materials
AHERA	Asbestos Hazard Emergency Response Act
AHMP	Asbestos Hazard Management Program
ASHARA	Asbestos in Schools Hazard Abatement Reauthorization Act
CIH	Certified Industrial Hygienist
DHHS	Department of Health and Human Services
EL	Excursion Level (OSHA Regulations)
EPA	Environmental Protection Agency
HEPA	High Efficiency Particulate Air
HHCU	Health Hazards Control Unit
HVAC	Heating, Ventilation and Air Conditioning
LEA	Local Education Agency
MAP	Model Accreditation Plan (EPA Regulations)
MISC	Miscellaneous Materials
NESHAP	National Emission Standards for Hazardous Air Pollutants
NIOSH	National Institute for Occupation Safety and Health
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
PACM	Presumed Asbestos Containing Materials
PAPR	Powered Air Purifying Respirator

PCM	Phase Contrast Microscopy
PEL	Permissible Exposure Level (OSHA Regulations)
PLM	Polarized Light Microscopy
PPE	Personal Protective Equipment
RACM	Regulated Asbestos Containing Material
SSSD	Small Scale Short Duration
SUR	Surfacing Material
SWML	Solid Waste Municipal Landfill
TSI	Thermal System Insulation
TEM	Transmission Electron Microscopy