

**ASBESTOS HAZARD EMERGENCY RESPONSE ACT (AHERA)  
MANAGEMENT PLAN  
SCHOOL ADMINISTRATIVE UNIT NO. 28 - PELHAM SCHOOL DISTRICT  
PELHAM HIGH SCHOOL**

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# The Scott Lawson Group, Ltd.

Environmental, Health & Safety Consultants

## SECTION 1-Initial Inspection Signature Page

Name of LEA: School Administrative Unit No. 28-Pelham School District

Name of School: Pelham High School

Address of School: 85 Marsh Road, Pelham New Hampshire

The Inspection was conducted by the following Accredited Inspector as required under the AHERA regulations.

  
\_\_\_\_\_  
Stephen R. McPherson

AI 000204  
Accreditation Number

November 30, 2011  
Expiration Date

This management Plan was prepared by the following Accredited Management Planner as required under the AHERA regulations.

  
\_\_\_\_\_  
Richard A. Lent

AM 000061  
Accreditation Number

October 7, 2011  
Expiration Date



## **SECTION 2- Bulk Sampling Methodology**

A walkthrough of each area included in the survey was first conducted to determine the type and locations of suspect ACM. After this had been completed, *SLGL's* Safety & Health Professional then proceeded to collect samples of the suspect materials and submit them to be analyzed for possible Asbestos content.

Suspect ACM was identified and categorized into homogeneous categories, if necessary. Homogeneous means uniformity in texture, color, and appearance. A typical sampling scenario during this project may have consisted of:

1. The inspector, equipped with appropriate protective equipment and sampling gear, moistens the area where the sample is to be collected. A wetting agent is added to prevent disturbance of the material and the release of fibers into the air.
2. The sample is extracted using a clean knife and/or tweezers. The inspector cuts a small piece of material penetrating all layers.
3. The sample is placed in a labeled container and sealed. The exterior of the container is then wet-wiped clean.
4. Sampling tools are cleaned and any fallen debris is cleaned with a High-Efficiency, Particulate Air (HEPA) vacuum.

Samples were then delivered to *SLGL's* laboratory for analysis. The samples were analyzed for possible Asbestos content utilizing the EPA Method 600/R-93/116, July 1993, which incorporates the use of Polarized Light Microscopy (PLM).

## SECTION 2 - AHERA Inspection Summary for Pelham High School

The school was constructed around 1974 and serves approximately 650 students in grades 9-12. Very few AHERA documents were able to be located as part of this inspection. Due to the inability to locate the original Management Plan for the Pelham Memorial School, SAU #28 opted to develop a new Management Plan based on current conditions of remaining Asbestos-Containing Materials (ACM) at the School.

Review of available AHERA records for Pelham High School indicates that the last Triennial AHERA reinspections was performed by:

- RPF Associates (RPF) (2002)

Balsam Environmental Consultants, Inc. (Balsam), formerly of Salem, New Hampshire, performed the original Asbestos Hazard Emergency Response Act (AHERA) Inspection in 1988 and subsequently prepared the mandated Management for the Pelham Memorial School. According to school staff, minor Asbestos abatement projects were conducted at the school with Asbestos-containing flooring materials being removed.

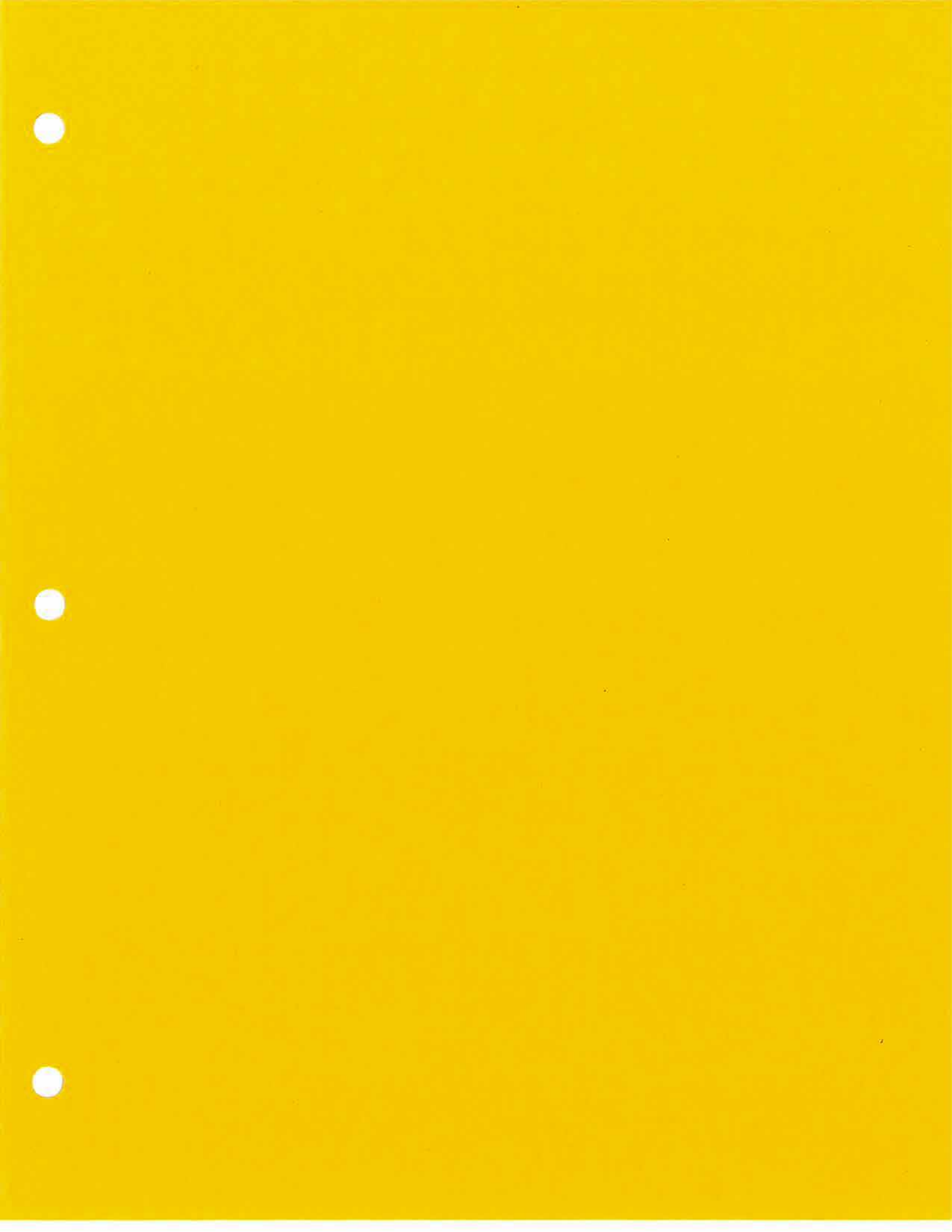
This inspection by *SLGL* of the school began with a thorough inspection of the facility to identify and assess the condition of ACBM, for which no previous sampling data is available. Each accessible room of the School was inspected for the presence of suspect ACBM. The survey was generally non-destructive in nature; i.e., areas between floors and/or walls were not accessed (unless access panels were available) to determine if ACM might be present. A walkthrough was first conducted in each area with suspect building materials being categorized into homogeneous groups, as needed. Bulk samples were collected and analyzed in accordance with EPA AHERA requirements. Sampling locations were selected in a random manner to reduce potential bias in sample collection and analysis. The samples of suspect materials were returned to *SLGL's* laboratory for analysis for possible Asbestos content utilizing the EPA Method 600/R-93/116, July 1993, which incorporates the use of Polarized Light Microscopy (PLM). *SLGL's* laboratory is a National Voluntary Accreditation Program-accredited laboratory (NVLAP No. 101228-1), for the analysis of bulk Asbestos samples by PLM. According to Federal and State regulations, materials containing greater than one percent (> 1%) Asbestos by dry weight is considered to be Asbestos-containing.

Fifteen (15) samples of suspect ACBM were collected for analysis. No Asbestos was detected in any of the sampling performed in February 2011; however, previous testing by *SLGL* in July 2007 of flooring materials documented that the 12 x 12 brown floor tiles and associated mastic is ACM.

During this survey *SLGL* tested building materials with no survey data available and remaining TSI. **No Asbestos** was detected in the following materials:

- Laboratory Table and Counter Tops
- 2 x 4 Ceiling Tiles
- 12 x 12 Gray Floor Tiles and associated Mastic
- Cover base and associated Mastic
- Gypsum Board and Joint Compound
- Pipe fitting insulation

The specific results of the AHERA reinspection(s) of the Pelham High School by; RPF in 2002 and *SLGL* in 2011, are contained in **Section 15**, **Section 4** contains previous Asbestos abatement report data that was available. The locations of materials in the school identified as Asbestos-containing and response actions recommended according to AHERA assessment of the material type and condition are found in **Section 5**. The appropriate response action, whether complete removal, repair or enclosure, or the implementation of an O&M plan alone, is determined by many factors. It should be noted that the identification of ACBM, without regard to its condition, requires that the school implement an O&M Plan. The O&M plan can be found in **Section 7**. The observations in this report are based solely upon conditions and information made available to *SLGL* at the time of the re-inspection.



## **SECTION 2- Bulk Sampling Methodology**

A walkthrough of each area included in the survey was first conducted to determine the type and locations of suspect ACM. After this had been completed, *SLGL's* Safety & Health Professional then proceeded to collect samples of the suspect materials and submit them to be analyzed for possible Asbestos content.

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**SECTION 16**

**SAU #28 - PELHAM HIGH SCHOOL**

**ARCHITECTS/GENERAL CONTRACTOR LETTERS**

### **SECTION 3 - Explanation of Reinspection Report, and use of Reinspection Report**

The purpose of this section is to present all data gathered during the reinspection, in a manner easily accessible to the Asbestos Coordinator(s) for School Administration Unit No. 28, to assist in implementation of the Pelham High School, Management Plan.

The presentation of the included tables combines two (2) tasks. The first is the AHERA required reporting of the information: and the second is the manipulation of the data into tables for use by the Asbestos Coordinator(s).

**Section 4** contains any sections that could be located of the Original Basam Management Plan for the school, which includes an inventory of testing and assessment's of Pelham High School building materials conducted in 1988.

**Section 5** contains Table II, detailing category and type of Asbestos-Containing Material, estimates of material assessed, general condition of material, friability, and AHERA assessment of identified ACBM, using the seven (7) designated EPA classifications, and Response Action Codes listed below.

#### **The EPA Assessment Codes identified in the Tables above are as follows:**

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

#### **The Response Action Codes identified in the Tables above are as follows:**

1. Monitor identified material under the Operations and Maintenance (O&M) Program.
2. Repair, encapsulate or enclose identified material, decontaminate immediate area, then monitor under the O&M Program.
3. Remove identified material, decontaminate immediate area. Remove material from Table above.

### **SECTION 3 - Explanation of Reinspection Report, and use of Reinspection Report**

**Section 6** contains a Photo Log of identified ACBM at the Pelham High School.

**Section 7** contains the Operations and Maintenance (O&M) Plan. This is for use by the Asbestos Coordinator, custodians, maintenance workers, and outside contractors. When work is to be performed in a given area of the school, the respective personnel will reference this section to determine if ACBM are present and then proceed to the O&M Flow Chart.

**Section 8** contains a copy of the EPA AHERA Regulation.

**Section 9** contains the Consortium of Northeast States (CONES) Asbestos Management in Schools Document that summarizes some of the key compliance elements of the AHERA regulation.

**Section 10** contains information relating to the duties of the School District's Asbestos Coordinator (Designated Person).

**Section 11** contains a form for recording of Asbestos related incidents.

**SECTION 4-Table I**

SAU #28-Pelham High School

2011 SLGL AHERA Sample Collection Inventory/Analytical Results



# The Scott Lawson Group, Ltd.

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SAU #28, Windham School District  
19 Haverhill Road  
P.O. Box 510  
Windham, NH 03087

SLGL Job #: 91838  
Report Date: February 28, 2011  
Date Sampled: February 23, 2011  
Date Received: February 24, 2011  
Client Project: Pelham Memorial School

Analysis: Asbestos by Polarized Light Microscopy  
Methodology: EPA-600/M4-82-020 / 600/R-93/116 July 1993

## Analytical Results

Collected by: SRM

| SLGL Lab # | Sample Identification  | Homogeneous | Obvious Layers | Fibrous | Color                | Asbestos % |         |             | Other Fibrous Material % |           |           |       | Non Fibrous Material | Date Analyzed | Analyst |
|------------|--|-------------|----------------|---------|----------------------|------------|---------|-------------|--------------------------|-----------|-----------|-------|----------------------|---------------|---------|
|            |  |             |                |         |                      | Chrvstole  | Amosite | Crocidolite | Glass                    | Cellulose | Synthetic | Other |                      |               |         |
| 287332*    | 022311-91838-B10A, 2X4 ceiling tile, second floor, room 200      | No          | Yes            | Yes     | Gray<br>White<br>Red | ---        | ---     | ---         | 40                       | 30        | ---       | ---   | 30                   | 02/28/2011    | NEF     |
| 287333*    | 022311-91838-B10B, 2X4 ceiling tile, second floor, room 204      | No          | Yes            | Yes     | Gray<br>White<br>Red | ---        | ---     | ---         | 40                       | 30        | ---       | ---   | 30                   | 02/28/2011    | NEF     |
| 287334*    | 022311-91838-B10C, 2X4 ceiling tile, second floor, room 211      | No          | Yes            | Yes     | Gray<br>White<br>Red | ---        | ---     | ---         | 40                       | 30        | ---       | ---   | 30                   | 02/28/2011    | NEF     |
| 287335     | 022311-91838-B11A, 12X12 blue floor tile, second floor, art room | No          | No             | No      | Blue                 | ---        | ---     | ---         | ---                      | ---       | ---       | ---   | 100                  | 02/28/2011    | NEF     |

This Polarized Light Microscopy report relates only to items tested. Client should not use the NVLAP to claim endorsement. PLM by visual area estimation can produce errors of 10%. Results near the 1% level can be more accurately quantified by the point count method or Transmission Electron Microscopy. SLGL laboratory certifications apply only to samples analyzed in-house. NVLAP Accreditation Number 101228-0.

- <: Less Than
- +: Analyzed using the EPA protocol for determining asbestos content in soil and river sediment.
- \*: Sample analyzed as a composite.
- \*\* : Sample analyzed as a composite; could not separate layers.
- \*\*\*: Sample reported as a composite; layers analyzed separately.
- +: Qualitative analysis only: Samples are reported as Present (P) or No Visible Asbestos (NVA). No accreditation exists for this type of qualitative analysis.

Reviewed By: Helen M Enzun

Approved By: Norman Fletcher  
Norman Fletcher, Lab Manager



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SAU #28, Windham School District  
19 Haverhill Road  
P.O. Box 510  
Windham, NH 03087

SLGL Job #: 91838  
Report Date: February 28, 2011  
Date Sampled: February 23, 2011  
Date Received: February 24, 2011  
Client Project: Pelham Memorial School

Analysis: Asbestos by Polarized Light Microscopy  
Methodology: EPA-600/M4-82-020 / 600/R-93/116 July 1993

## Analytical Results

Collected by: SRM

| SLGL Lab # | Sample Identification   | Homogeneous | Obvious Layers | Asbestos % |                |            | Other Fibrous Material % |             |       |           | Non Fibrous Material | Date Analyzed | Analyst |            |       |
|------------|---|-------------|----------------|------------|----------------|------------|--------------------------|-------------|-------|-----------|----------------------|---------------|---------|------------|-------|
|            |   |             |                | Fibrous    | Color          | Chrysotile | Amosite                  | Crocidolite | Glass | Cellulose |                      |               |         | Synthetic  | Other |
| 287336     | 022311-91838-B11B, 12X12 blue floor tile, second floor, room 203                      | No          | No             | No         | Blue           | ---        | ---                      | ---         | ---   | ---       | ---                  | ---           | 100     | 02/28/2011 | NEF   |
| 287337     | 022311-91838-B11C, 12X12 blue floor tile, first floor, custodial office               | No          | No             | No         | Blue           | ---        | ---                      | ---         | ---   | ---       | ---                  | ---           | 100     | 02/28/2011 | NEF   |
| 287338*    | 022311-91838-B12A, 12X12 blue floor tile, black mastic, second floor, art room        | No          | Yes            | Yes        | Brown<br>Black | ---        | ---                      | ---         | ---   | 2         | ---                  | ---           | 98      | 02/28/2011 | NEF   |
| 287339*    | 022311-91838-B12B, 12X12 blue floor tile, black mastic, second floor, room 203        | No          | Yes            | Yes        | Black<br>Brown | ---        | ---                      | ---         | ---   | 2         | ---                  | ---           | 98      | 02/28/2011 | NEF   |
| 287340*    | 022311-91838-B12C, 12X12 blue floor tile, black mastic, first floor, custodial office | No          | Yes            | Yes        | Black<br>Brown | ---        | ---                      | ---         | ---   | 2         | ---                  | ---           | 98      | 02/28/2011 | NEF   |

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Reviewed By: Helen M Estlin

Approved By: Norm E Fletcher  
Norman Fletcher, Lab Manager

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SAU #28, Windham School District  
19 Haverhill Road  
P.O. Box 510  
Windham, NH 03087

SLGL Job #: 91838

Report Date: March 1, 2011

Date Sampled: February 23, 2011

Date Received: February 24, 2011

Client Project: Pelham Memorial School

Analysis: Asbestos by Polarized Light Microscopy  
Methodology: EPA-600/M4-82-020 / 600/R-93/116 July 1993

## Analytical Results

Collected by: SRM

| SLGL Lab # | Sample Identification   | Homogeneous | Obvious |         | Asbestos % |            |         | Other Fibrous Material % |       |           |           | Non Fibrous Material | Date Analyzed | Analyst    |       |
|------------|---|-------------|---------|---------|------------|------------|---------|--------------------------|-------|-----------|-----------|----------------------|---------------|------------|-------|
|            |   |             | Layers  | Fibrous | Color      | Chrysotile | Amosite | Crocidolite              | Glass | Cellulose | Synthetic |                      |               |            | Other |
| 287341     | 022311-91838-B13A, Pipe fitting insulation, boiler room annex, domestic cw line             | No          | No      | Yes     | Gray       | ---        | ---     | ---                      | 10    | 2         | ---       | ---                  | 88            | 02/28/2011 | NEF   |
| 287342     | 022311-91838-B13B, Pipe fitting insulation, boiler room annex, domestic hw line             | No          | No      | Yes     | Gray       | 2          | ---     | ---                      | 10    | ---       | ---       | ---                  | 88            | 02/28/2011 | NEF   |
| 287343     | 022311-91838-B13C, Pipe fitting insulation, basement, boys locker room, domestic water line | No          | No      | Yes     | Gray       | ---        | ---     | ---                      | 10    | <1        | ---       | ---                  | >89           | 02/28/2011 | NEF   |
| 287344     | 022311-91838-B14A, Pipe fitting insulation, boiler room annex, heating                      | No          | No      | Yes     | Gray       | 8          | ---     | ---                      | 10    | 2         | ---       | ---                  | 80            | 02/28/2011 | NEF   |
| 287345     | 022311-91838-B14B, Pipe fitting insulation, boiler room annex, heating                      | No          | No      | Yes     | Gray       | 5          | ---     | ---                      | 10    | <1        | ---       | ---                  | >84           | 02/28/2011 | NEF   |

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Reviewed By: Helen M Enzen

Approved By: Norm E Fletcher  
Norman Fletcher, Lab Manager



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SAU #28, Windham School District  
19 Haverhill Road  
P.O. Box 510  
Windham, NH 03087

SLGL Job #: 91838

Report Date: February 28, 2011

Date Sampled: February 23, 2011

Date Received: February 24, 2011

Client Project: Pelham Memorial School

Analysis: Asbestos by Polarized Light Microscopy

Methodology: EPA-600-/M4-82-020 / 600/R-93/116 July 1993

## Analytical Results

Collected by: SRM

| SLGL Lab # | Sample Identification   | Homogeneous | Obvious |         | Asbestos % |            |         | Other Fibrous Material % |               |           |           | Non Fibrous Material | Date Analyzed | Analyst    |       |
|------------|---|-------------|---------|---------|------------|------------|---------|--------------------------|---------------|-----------|-----------|----------------------|---------------|------------|-------|
|            |   |             | Layers  | Fibrous | Color      | Chrysotile | Amosite | Crocidolite              | Fibrous Glass | Cellulose | Synthetic |                      |               |            | Other |
| 287346     | 022311-91838-B14C, Pipe fitting insulation, basement, boys locker room, heating | No          | No      | Yes     | Gray       | ---        | ---     | ---                      | 10            | 2         | ---       | ---                  | 88            | 02/28/2011 | NEF   |

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Reviewed By: Helen H Engen

Approved By: Norman Fletcher  
Norman Fletcher, Lab Manager





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Concord, New Hampshire 03301  
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www.slgl.com email: Lab@slgl.com

Sponsoring Co.: SAU 28  
SLGL Job #: 91838  
Address: PELHAM H.S.  
ANGLA  
Client Project:  
Client PO:  
Attention:  
Sampled By: SMC  
Phone: Fax: email:

Turnaround Time (select one)  
 3 hours\*    6-8 hours\*    24 hours\*    48 hours\*    72 hours\*  
 5 days    10 days    Weekend    Other: \_\_\_\_\_

*\*Not available for all tests. Schedule rush and weekend tests in advance.*

Sample Matrix Type (select one)  
 Air    Bulk    Soil    Water, drinking or waste  
 Aqueous    Oil    Solid    Wipe  
 Agar (biostrip)    Paint    Swab    Wipe composite  
 Agar (plate)    Sludge    Tape Lift    Other: \_\_\_\_\_

*All samples on this form should be of the SAME matrix type. Use additional forms as needed.*   Samples received in good condition?  Yes  No

| SLGL Lab #     | Sample Identification | Analysis | Date Sampled | Time | Media/ Container | Preservative | 4°C | Swab/Wipe Area Units: _____ | Air Volume (L) | Minutes |
|----------------|-----------------------|----------|--------------|------|------------------|--------------|-----|-----------------------------|----------------|---------|
| 287312         | 022311-91838 - B01A   | PLM      | 2/23         | -    | bag              |              |     |                             |                |         |
| 313            | B01B                  |          |              |      |                  |              |     |                             |                |         |
| 314            | B02A                  |          |              |      |                  |              |     |                             |                |         |
| 315            | B02B                  |          |              |      |                  |              |     |                             |                |         |
| 316            | B03A                  |          |              |      |                  |              |     |                             |                |         |
| 317            | B03B                  |          |              |      |                  |              |     |                             |                |         |
| 318            | B04A                  |          |              |      |                  |              |     |                             |                |         |
| 319            | B04B                  |          |              |      |                  |              |     |                             |                |         |
| 320            | B04C                  |          |              |      |                  |              |     |                             |                |         |
| <del>321</del> | <del>_____</del>      |          |              |      |                  |              |     |                             |                |         |

Sample Collection and Custody Information   Samples Shipped Via:  FedEx  UPS  DHL  US Mail  Drop Box  Drop Off  Other

Relinquished By: *DM*   1330   2/24/11   Date/Time:   Received By: *William J. Patterson*   Date/Time: 02/24/11 1315

Relinquished By:   Date/Time:   Received By:   Date/Time:

**A Note to Customer: by signing and relinquishing your samples to the laboratory, you agree with the terms and conditions found on the back of this Chain of Custody Form.**



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Concord, New Hampshire 03301  
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www.slgl.com email: Lab@slgl.com

Sponsoring Co.: SAUZE  
SLGL Job #: 91838  
Address: \_\_\_\_\_ Client Project: Rehoboth H.S. A HGLA  
Client PO: \_\_\_\_\_

Turnaround Time (select one)  
 3 hours\*    6-8 hours\*    24 hours\*    48 hours\*    72 hours\*  
 5 days    10 days    Weekend    Other: \_\_\_\_\_

Attention: \_\_\_\_\_ Sampled By: SMC  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ email: \_\_\_\_\_

*\*Not available for all tests. Schedule rush and weekend tests in advance.*

Sample Matrix Type (select one)  
 Air    Bulk    Soil    Water, drinking or waste  
 Aqueous    Oil    Solid    Wipe  
 Agar (biostrip)    Paint    Swab    Wipe composite  
 Agar (plate)    Sludge    Tape Lift    Other: \_\_\_\_\_

*All samples on this form should be of the SAME matrix type. Use additional forms as needed.*   Samples received in good condition?  Yes  No

| SLGL Lab # | Sample Identification | Analysis | Date Sampled | Time | Media/ Container | Preservative | 4°C | Swab/Wipe Area Units: _____ | Air Volume (L) | Minutes |
|------------|-----------------------|----------|--------------|------|------------------|--------------|-----|-----------------------------|----------------|---------|
| 287321     | 022311-91838<br>B05A  | PLM      | 2/23         | T    | bag              |              |     |                             |                |         |
| 322        | B05B                  |          |              |      |                  |              |     |                             |                |         |
| 323        | B06A                  |          |              |      |                  |              |     |                             |                |         |
| 324        | B06B                  |          |              |      |                  |              |     |                             |                |         |
| 325        | B07A                  |          |              |      |                  |              |     |                             |                |         |
| 326        | B07B                  |          |              |      |                  |              |     |                             |                |         |
| 327        | B07C                  |          |              |      |                  |              |     |                             |                |         |
| 287328     | B07D                  |          |              |      |                  |              |     |                             |                |         |

Sample Collection and Custody Information   Samples Shipped Via:  FedEx  UPS  DHL  US Mail  Drop Box  Drop Off  Other

Relinquished By: [Signature]   Date/Time: 2/24/11   Received By: [Signature]   Date/Time: 02/24/11 1315

*A Note to Customer: by signing and relinquishing your samples to the laboratory, you agree with the terms and conditions found on the back of this Chain of Custody Form.*



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Ph: (603) 228-3610, Fax: (603) 228-3871  
www.slgl.com email: Lab@slgl.com

Submitting Co.: SAU20  
SLGL Job #: 91838  
Address: \_\_\_\_\_  
Client Project: Rehman H.S.  
Client PO: \_\_\_\_\_

Turnaround Time (select one)  
 3 hours\*    6-8 hours\*    24 hours\*    48 hours\*    72 hours\*  
 5 days    10 days    Weekend    Other: \_\_\_\_\_

Attention: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Sampled By: Jm c  
 email: \_\_\_\_\_

*\*Not available for all tests. Schedule rush and weekend tests in advance.*

Sample Matrix Type (select one)  
 Air    Bulk    Soil    Water, drinking or waste  
 Aqueous    Oil    Solid    Wipe  
 Agar (biostrip)    Paint    Swab    Wipe composite  
 Agar (plate)    Sludge    Tape Lift    Other: \_\_\_\_\_

*All samples on this form should be of the SAME matrix type. Use additional forms as needed.*   Samples received in good condition?  Yes  No

| SLGL Lab # | Sample Identification | Analysis | Date Sampled | Time | Media/ Container | Preservative | 4°C | Swab/Wipe Area Units: _____ | Air Volume (L) | Minutes |
|------------|-----------------------|----------|--------------|------|------------------|--------------|-----|-----------------------------|----------------|---------|
| 087329     | 022311-91838<br>B08A  | PLM      | 02/23/11     | —    | Bag              |              |     |                             |                |         |
| 330        | B08B                  | I        | I            | I    |                  |              |     | N/A                         |                |         |
| 087331     | B08C                  | I        | I            | I    |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |

Sample Collection and Custody Information   Samples Shipped Via:  FedEx  UPS  DHL  US Mail  Drop Box  Drop Off  Other

Relinquished By: Jm c   2-24-11   1350   Date/Time: \_\_\_\_\_  
 Received By: Melissa L. Patterson   Date/Time: 02/24/11 1315

Relinquished By: \_\_\_\_\_   Date/Time: \_\_\_\_\_  
 Received By: \_\_\_\_\_   Date/Time: \_\_\_\_\_

*A Note to Customer: by signing and relinquishing your samples to the laboratory, you agree with the terms and conditions found on the back of this Chain of Custody Form.*



20 Chenell Drive  
Concord, New Hampshire 03301  
Ph: (603) 228-3610, Fax: (603) 228-3871  
www.slgl.com email: Lab@slgl.com

Sending Co.: SAU 28  
SLGL Job #: 91838  
Address: PELHAM H.S.  
AIRGLA  
Client Project:  
Client PO:

Turnaround Time (select one)  
 3 hours\*    6-8 hours\*    24 hours\*    48 hours\*    72 hours\*  
 5 days    10 days    Weekend    Other: \_\_\_\_\_

Attention:  
 Phone:   Fax:  
 Sampled By: SMC  
 email:

*\*Not available for all tests. Schedule rush and weekend tests in advance.*

Sample Matrix Type (select one)  
 Air    Bulk    Soil    Water, drinking or waste  
 Aqueous    Oil    Solid    Wipe  
 Agar (biostrip)    Paint    Swab    Wipe composite  
 Agar (plate)    Sludge    Tape Lift    Other: \_\_\_\_\_

*All samples on this form should be of the SAME matrix type. Use additional forms as needed.*   Samples received in good condition?  Yes  No

| SLGL Lab #     | Sample Identification        | Analysis | Date Sampled | Time | Media/ Container | Preservative | 4°C | Swab/Wipe Area Units: _____ | Air Volume (L) | Minutes |
|----------------|------------------------------|----------|--------------|------|------------------|--------------|-----|-----------------------------|----------------|---------|
| 087312         | 022311-91838-B01A            | PLM      | 2/23         | -    | bag              | -            | -   | -                           | -              | -       |
| 313            | B01B                         |          |              |      |                  |              |     |                             |                |         |
| 314            | B02A                         |          |              |      |                  |              |     |                             |                |         |
| 315            | B02B                         |          |              |      |                  |              |     |                             |                |         |
| 316            | B03A                         |          |              |      |                  |              |     |                             |                |         |
| 317            | B03B                         |          |              |      |                  |              |     |                             |                |         |
| 318            | B04A                         |          |              |      |                  |              |     |                             |                |         |
| 319            | B04B                         |          |              |      |                  |              |     |                             |                |         |
| 320            | B04C                         | -        | -            | -    | -                | -            | -   | -                           | -              | -       |
| <del>321</del> | <del>022311-91838-B04D</del> |          |              |      |                  |              |     |                             |                |         |

Sample Collection and Custody Information   Samples Shipped Via:  FedEx  UPS  DHL  US Mail  Drop Box  Drop Off  Other

Relinquished By: Jim [Signature]   1330   2/24/11   Date/Time:  
 Received By: [Signature]   Date/Time: 02/24/11 1315

*A Note to Customer: by signing and relinquishing your samples to the laboratory, you agree with the terms and conditions found on the back of this Chain of Custody Form.*



The Scott Lawson Group, Ltd.  
Environmental, Health & Safety Consultants

20 Chenell Drive  
Concord, New Hampshire 03301  
Ph: (603) 228-3610, Fax: (603) 228-3871  
www.slgl.com email: Lab@slgl.com

Shipping Co.: SAUDE  
SLGL Job #: 91838  
Address: Ralston H.S. High  
Client Project:  
Client PO:

Turnaround Time (select one)  
 3 hours\*    6-8 hours\*    24 hours\*    48 hours\*    72 hours\*  
 5 days    10 days    Weekend    Other: \_\_\_\_\_

Attention:  
Sampled By: SMC  
Phone:   Fax:   email:

*\*Not available for all tests. Schedule rush and weekend tests in advance.*

Sample Matrix Type (select one)  
 Air    Bulk    Soil    Water, drinking or waste  
 Aqueous    Oil    Solid    Wipe  
 Agar (biostrip)    Paint    Swab    Wipe composite  
 Agar (plate)    Sludge    Tape Lift    Other: \_\_\_\_\_

Comments:

*All samples on this form should be of the SAME matrix type. Use additional forms as needed.*

Samples received in good condition?  Yes  No

| SLGL Lab #   | Sample Identification | Analysis | Date Sampled | Time | Media/ Container | Preservative | 4°C | Swab/Wipe Area Units: _____ | Air Volume (L) | Minutes |
|--------------|-----------------------|----------|--------------|------|------------------|--------------|-----|-----------------------------|----------------|---------|
| 222311-91838 | B017A                 | PLM      | 2/22         | T    | bag              |              |     |                             |                |         |
| 322          | B052                  |          |              |      |                  |              |     |                             |                |         |
| 323          | B060A                 |          |              |      |                  |              |     |                             |                |         |
| 324          | B063                  |          |              |      |                  |              |     |                             |                |         |
| 325          | B07A                  |          |              |      |                  |              |     |                             |                |         |
| 326          | B07B                  |          |              |      |                  |              |     |                             |                |         |
| 327          | B07C                  |          |              |      |                  |              |     |                             |                |         |
| 328          | B07D                  |          |              |      |                  |              |     |                             |                |         |

Sample Collection and Custody Information

Samples Shipped Via:  FedEx  UPS  DHL  US Mail  Drop Box  Drop Off  Other

Relinquished By: [Signature]   Date/Time: 2/24/11  
 Received By: [Signature]   Date/Time: 02/24/11 1315

*A Note to Customer: by signing and relinquishing your samples to the laboratory, you agree with the terms and conditions found on the back of this Chain of Custody Form.*



20 Chenell Drive  
Concord, New Hampshire 03301  
Ph: (603) 228-3610, Fax: (603) 228-3871  
www.slgl.com email: Lab@slgl.com

Shipping Co.: SAUGO  
SLGL Job #: 51835  
Address: Client Project: Rehman H.S.  
Client PO:

Turnaround Time (select one)  
 3 hours\*    6-8 hours\*    24 hours\*    48 hours\*    72 hours\*  
 5 days    10 days    Weekend    Other: \_\_\_\_\_

Attention: Sampled By: SMC  
 Phone: Fax: email:

*\*Not available for all tests. Schedule rush and weekend tests in advance.*

Sample Matrix Type (select one)  
 Air    Bulk    Soil    Water, drinking or waste  
 Aqueous    Oil    Solid    Wipe  
 Agar (biostrip)    Paint    Swab    Wipe composite  
 Agar (plate)    Sludge    Tape Lift    Other: \_\_\_\_\_

*All samples on this form should be of the SAME matrix type. Use additional forms as needed.*   Samples received in good condition?  Yes  No

| SLGL Lab # | Sample Identification | Analysis | Date Sampled | Time | Media/ Container | Preservative | 4°C | Swab/Wipe Area Units: _____ | Air Volume (L) | Minutes |
|------------|-----------------------|----------|--------------|------|------------------|--------------|-----|-----------------------------|----------------|---------|
| 187329     | 022311-51835<br>BUBA  | PLM      | 02/23/11     | -    | Bag              |              |     |                             |                |         |
| 187330     | BUBB                  | I        | I            | I    | I                |              |     | N/A                         |                |         |
| 187331     | BUBC                  | I        | I            | I    | I                |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |
|            |                       |          |              |      |                  |              |     |                             |                |         |

Sample Collection and Custody Information   Samples Shipped Via:  FedEx  UPS  DHL  US Mail  Drop Box  Drop Off  Other

Relinquished By: [Signature] 2-24-11 1350   Date/Time:   Received By: [Signature]   Date/Time: 02/24/11 1315

Relinquished By:   Date/Time:   Received By:   Date/Time:

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**School Administrative Unit No. 28 - Pelham School District  
Pelham High School  
85 Marsh Road  
Pelham, New Hampshire**

**TABLE I-ASBESTOS-CONTAINING MATERIALS**

**FIRST FLOOR**

| <b>Room No.</b>                   | <b>ACM Description</b>      | <b>EPA Category</b> | <b>Approximate Quantity</b> | <b>EPA Assessment</b> | <b>Resp. Action</b> | <b>Friable Y/N</b> |
|-----------------------------------|-----------------------------|---------------------|-----------------------------|-----------------------|---------------------|--------------------|
| Maintenance Garage                | Generator Exhaust           | TSI                 | 15 LF                       | 7                     | 1                   | Y                  |
| Kitchen                           | Linoleum                    | Misc.               | 400 ft <sup>2</sup>         | 5                     | 1                   | N                  |
| Cafeteria                         | Brown Floor Tile and Mastic | Misc.               | 3,500 ft <sup>2</sup>       | 5                     | 1                   | N                  |
| Room 2                            | White Floor Tile and Mastic | Misc.               | 1,730 ft <sup>2</sup>       | 5                     | 1                   | N                  |
| Rooms 3&4                         | Brown Floor Tile and Mastic | Misc.               | 2,240 ft <sup>2</sup>       | 5                     | 1                   | N                  |
| Room 5                            | Brown Floor Tile and Mastic | Misc.               | 800 ft <sup>2</sup>         | 5                     | 1                   | N                  |
| Room 6                            | Brown Floor Tile and Mastic | Misc.               | 960 ft <sup>2</sup>         | 5                     | 1                   | N                  |
| SPED & Misc. Rooms by Rooms 6 & 7 | Brown Floor Tile and Mastic | Misc.               | 660 ft <sup>2</sup>         | 5                     | 1                   | N                  |

**School Administrative Unit No. 28 - Pelham School District  
Pelham High School  
85 Marsh Road  
Pelham, New Hampshire**

**TABLE I-ASBESTOS-CONTAINING MATERIALS**

**FIRST FLOOR**

| <b>Room No.</b>   | <b>ACM Description</b>                  | <b>EPA Category</b> | <b>Approximate Quantity</b> | <b>EPA Assessment</b> | <b>Resp. Action</b> | <b>Friable Y/N</b> |
|-------------------|---|---------------------|-----------------------------|-----------------------|---------------------|--------------------|
| Guidance          | Brown Floor Tile and Mastic             | Misc.               | 1300 ft <sup>2</sup>        | 5                     | 1                   | N                  |
| Nurse             | Brown Floor Tile and Mastic             | Misc.               | 150 ft <sup>2</sup>         | 5                     | 1                   | N                  |
| Main Office       | Brown Floor Tile and Mastic             | Misc.               | 125 ft <sup>2</sup>         | 5                     | 1                   | N                  |
| Room 8            | Brown Floor Tile and Mastic             | Misc.               | 700 ft <sup>2</sup>         | 5                     | 1                   | N                  |
| Teachers Wok Room | Brown Floor Tile and Mastic             | Misc.               | 1520 ft <sup>2</sup>        | 5                     | 1                   | N                  |
| Corridors         | Brown Floor Tile and Mastic             | Misc.               | 1900 ft <sup>2</sup>        | 5                     | 1                   | N                  |
| Room 22 Science   | Asbestos-cement Board<br>Fume Hoods (2) | Misc.               | 30 ft <sup>2</sup>          | 5                     | 1                   | N                  |



**School Administrative Unit No. 28 - Pelham School District  
Pelham High School  
85 Marsh Road  
Pelham, New Hampshire**

**TABLE II-ASBESTOS-CONTAINING MATERIALS**

**SECOND FLOOR**

| <b>Room No.</b>                       | <b>ACM Description</b>      | <b>EPA Category</b> | <b>Approximate Quantity</b> | <b>EPA Assessment</b> | <b>Resp. Action</b> | <b>Friable Y/N</b> |
|---------------------------------------|-----------------------------|---------------------|-----------------------------|-----------------------|---------------------|--------------------|
| Second Floor, Work Room<br>By Room 34 | Brown Floor Tile and Mastic | Misc.               | 160 ft <sup>2</sup>         | 5                     | 1                   | N                  |
| Room 33                               | Brown Floor Tile and Mastic | Misc.               | 1,200 ft <sup>2</sup>       | 5                     | 1                   | N                  |

**School Administrative Unit No. 28 - Pelham School District**  
**Pelham High School**  
**85 Marsh Road**  
**Pelham, New Hampshire**

The EPA Assessment Codes identified in the Table above are as follows:

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

The Response Action Codes identified in the Table above are as follows:

1. Monitor identified material under the Operations and Maintenance Program.
2. Repair, encapsulate or enclose identified material, decontaminate immediate area, then monitor under the Operations and Maintenance Program.
3. Remove identified material, decontaminate immediate area. Remove material from Table above.

**SECTION 6**

SAU #28-Pelham High School

ACM Location Drawings

|                     |  |
|---------------------|--|
| District:           | SAU #28  |
| School Name:        | Pelham High School                             |
| Address:            | 85 Marsh Rd.<br>Pelham, NH 03076               |
| School Hours:       |  |
| In-session Contact: | Dr. Dorothy Mohr - (603) 635-2115              |
| Off-Hours Contact:  | Dr. Dorothy Mohr - (603) 635-2115              |
| Approach Hazards:   |  |
| Notes:              | Windows on sides C and D are high in the rooms |

## First Floor and Portables

Side C

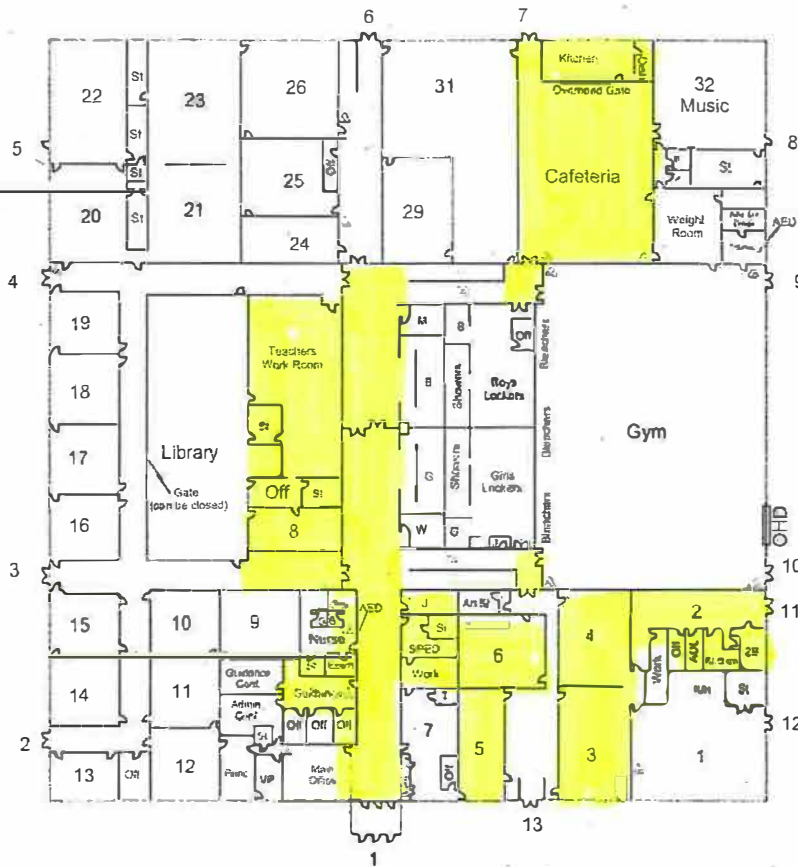
For Official Use Only



|  |                                    |
|--|------------------------------------|
| <b>Alarm &amp; Monitoring Systems</b>    |                                    |
| Closed Circuit Cameras                   |                                    |
| <b>Security &amp; Fire Alarm Systems</b> |                                    |
| Knox Box                                 |                                    |
| Motion Detecting Devices                 |                                    |
| <b>Communication Systems</b>             |                                    |
| Cable TV Access                          |                                    |
| Intercom System                          |                                    |
| Portable Radios                          |                                    |
| Phones in Rooms                          |                                    |
| <b>Hazards</b>                           |                                    |
| <b>Hazardous Materials</b>               |                                    |
| <b>Building Systems</b>                  |                                    |
| Electrical Shutoff                       | Storage Room, 2nd Floor            |
| Oil Shutoff                              | Boiler Room, 2nd Floor             |
| Water Shutoff                            |                                    |
| Roof Type                                | Flat Roof                          |
| Roof Access                              | Access from Storage Room 2nd floor |
| <b>Other</b>                             |                                    |
| Bus Company                              |                                    |
| Wall Construction                        | Masonry/Brick for main building    |

Side B

Side D














Side A

- Legend**
- Ramp
  - Elevator
  - Fire Extinguisher
  - Gas Shut-Off
  - Electrical Shut-Off
  - Water Shut-Off
  - Chair Lift
  - Sprinkler Shut-Off
  - Generator
  - Camera
  - Fire Standpipe

|                     |  |
|---------------------|--|
| District:           | SAU #28  |
| School Name:        | Pelham High School                             |
| Address:            | 85 Marsh Rd.<br>Pelham, NH 03076               |
| School Hours:       |  |
| In-session Contact: | Dr. Doralhy Mohr - (603) 635-2115              |
| Off-Hours Contact:  | Dr. Dorothy Mohr - (603) 635-2115              |
| Approach Hazards:   |  |
| Notes:              | Windows on sides C and D are high in the rooms |

|                                       |  |
|---------------------------------------|--|
| <b>Alarm &amp; Monitoring Systems</b> |  |
| Closed Circuit Cameras                | <input checked="" type="checkbox"/>                                    |
| Security & Fire Alarm Systems         | <input checked="" type="checkbox"/>                                    |
| Knox Box                              | No   |
| Motion Detecting Devices              | <input checked="" type="checkbox"/>                                    |
| <b>Communication Systems</b>          |  |
| Cable TV Access                       | <input checked="" type="checkbox"/>                                    |
| Intercom System                       | <input checked="" type="checkbox"/>                                    |
| Portable Radios                       | <input checked="" type="checkbox"/>                                    |
| Phones in Rooms                       | No   |
| <b>Hazards</b>                        |  |
| Hazardous Materials                   | <input checked="" type="checkbox"/>                                    |
| <b>Building Systems</b>               |  |
| Electrical Shutoff                    | <input checked="" type="checkbox"/> Storage Room, 2nd Floor            |
| Oil Shutoff                           | <input checked="" type="checkbox"/> Boiler Room, 2nd Floor             |
| Water Shutoff                         | <input checked="" type="checkbox"/>                                    |
| Roof Type                             | Flat Roof  |
| Roof Access                           | <input checked="" type="checkbox"/> Access from Storage Room 2nd floor |
| <b>Other</b>                          |  |
| Bus Company                           |  |
| Wall Construction                     | Masonry/Brick for main building.                                       |

**Legend**

-  Ramp
-  Elevator
-  Fire Extinguisher
-  Gas Shut-Off
-  Electrical Shut-Off
-  Water Shut-Off
-  Chair Lift
-  Sprinkler Shutoff
-  Generator
-  Camera
-  Fire Standpipe

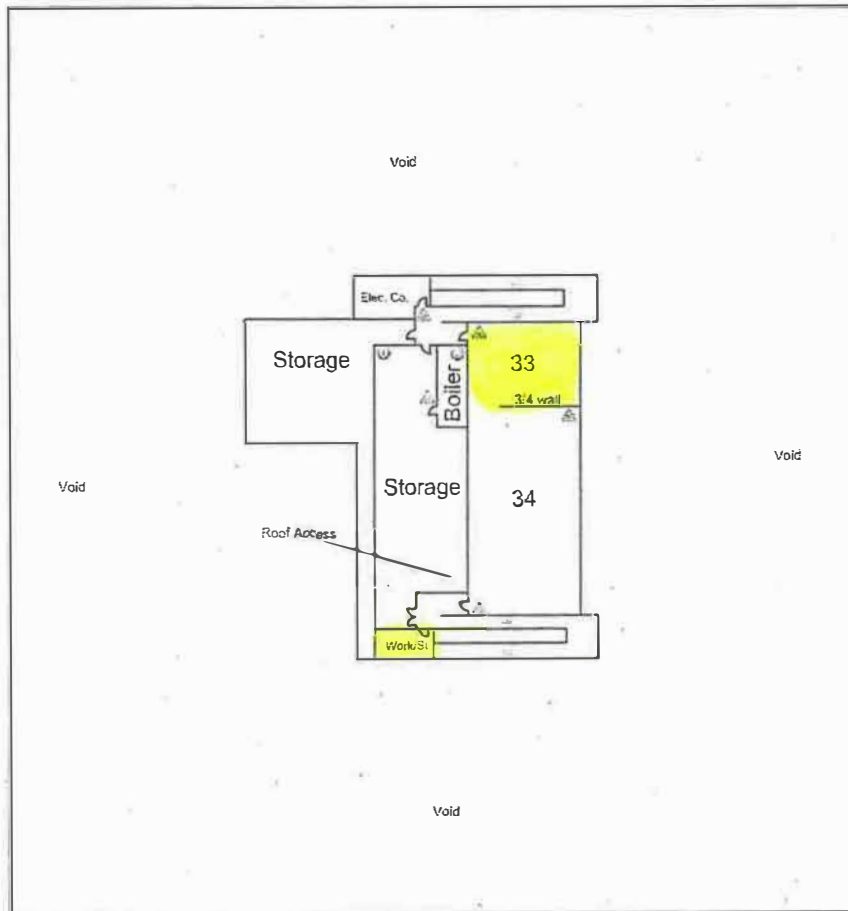
Second Floor

Side C

For Office Use Only

Side B

Side D



Side A

**SECTION 7**

SAU #28-Pelham High School

EPA AHERA Regulation

**Environmental Protection Agency**

**§ 763.80**

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.

**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 NON-MANDATORY—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.

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  $\mu\text{m}$  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, non-profit 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.



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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, be-

fore 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

area that is greater than 5,000 ft<sup>2</sup>, 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) anal-

ysis 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:

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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<sup>2</sup>).

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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, leak-tight 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

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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

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(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 gen-

eral, 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,

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(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

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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,



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 sensi-

tivity be no greater than 0.005 structures/cm<sup>3</sup>.

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<sup>2</sup> in an area of 0.057 mm<sup>2</sup> (nominally 10 200-mesh grid openings) and a maximum of 53 structures/mm<sup>2</sup> 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<sup>2</sup>.

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.

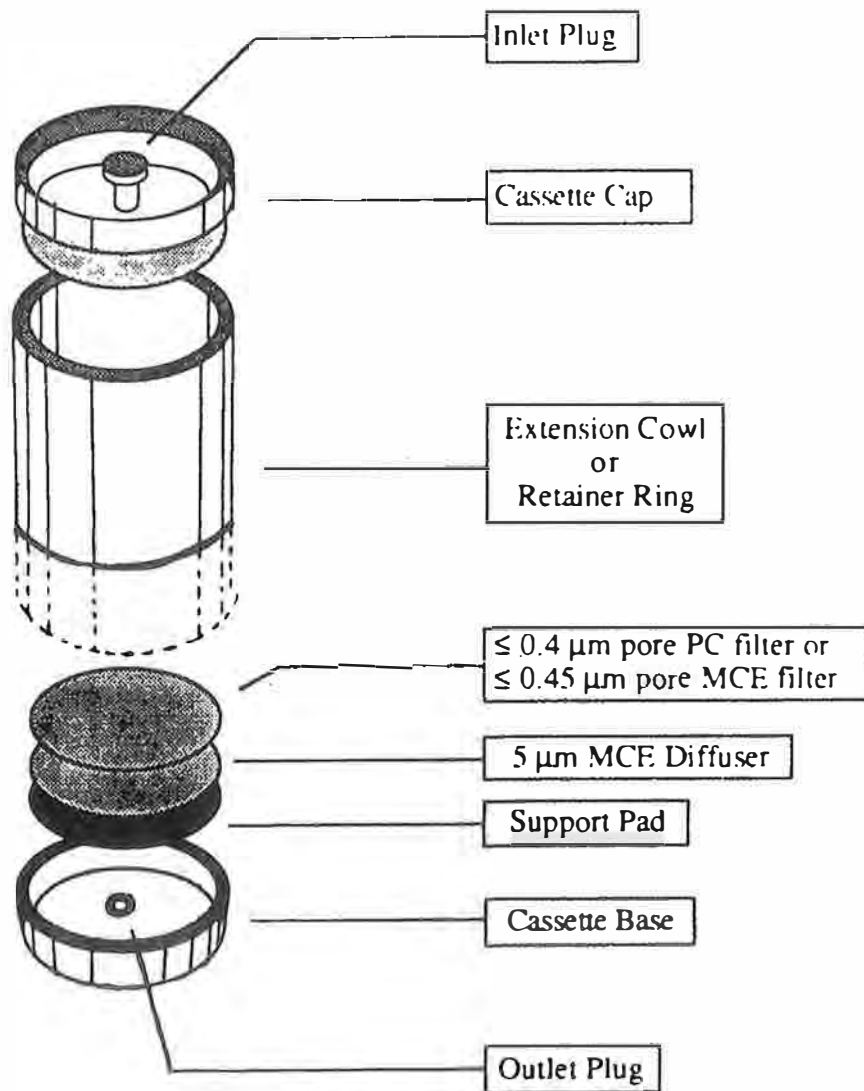
15. *NSD*—No structure detected.

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

17. *PCM*—Phase contrast microscopy.

18. *SAED*—Selected area electron diffraction.

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.

TABLE 1--NUMBER OF 200 MESH EM GRID OPENINGS (0.0057 MM<sup>2</sup>) THAT NEED TO BE ANALYZED TO MAINTAIN SENSITIVITY OF 0.005 STRUCTURES/CC BASED ON VOLUME AND EFFECTIVE FILTER AREA

| Effective Filter Area<br>385 sq mm |                    | Effective Filter Area<br>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                 |
| 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                  |

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 up-right 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:

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 ashers and operating conditions will then be set such that a 1-2  $\mu\text{m}$  (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.

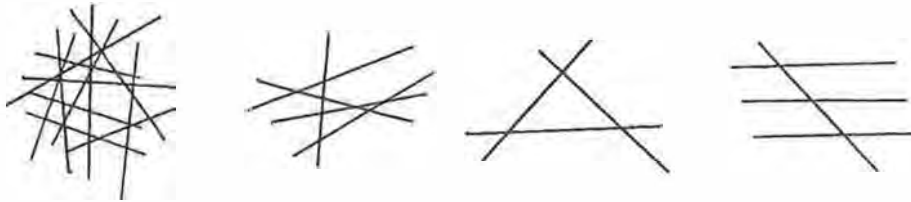
b. The replica is doubled or folded.

c. The replica is too dark because of incomplete dissolution of the filter.

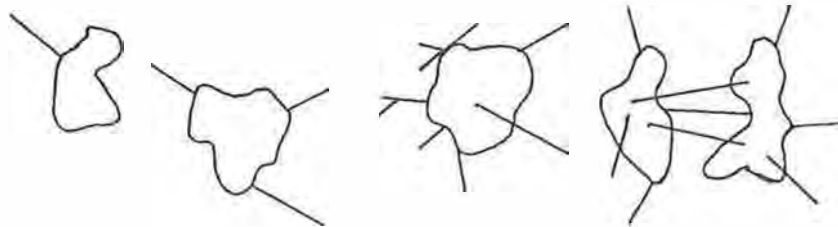
9. *Recording Rules.*

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  $\mu\text{m}$  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 non-parallel touching or crossing of fibers, with the projection having an aspect ratio of 5:1 or greater. See the following Figure 2:

Count clusters as 1 structure; fibers having greater than or equal to 3 intersections.



Count matrix as 1 structure.



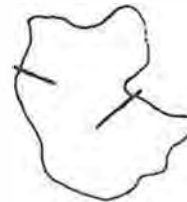
DO NOT COUNT AS STRUCTURES:



Fiber protrusion  
<5:1 Aspect Ratio



No fiber protrusion



Fiber protrusion  
<0.5 micrometer

— <0.5 micrometer in length  
— <5:1 Aspect Ratio

i. *Fiber*. A structure having a minimum length greater than or equal to 0.5  $\mu\text{m}$  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  $\mu\text{m}$  and for fibers equal to or greater than 5  $\mu\text{m}$  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

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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.

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<sup>2</sup>.

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<sup>3</sup>*—Structures per cubic centimeter.

23. *S/mm<sup>2</sup>*—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 cowl 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  $\mu\text{m}$  or mixed cellulose ester having a pore size of less than or equal to 0.45  $\mu\text{m}$ .

g. Place these filters in series with a backup filter with a pore size of 5.0  $\mu\text{m}$  (to serve as a diffuser) and a support pad. See the following Figure 1:

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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:



TABLE 1--NUMBER OF 200 MESH EM GRID OPENINGS (0.0057 MM<sup>2</sup>) THAT NEED TO BE ANALYZED TO MAINTAIN SENSITIVITY OF 0.005 STRUCTURES/CC BASED ON VOLUME AND EFFECTIVE FILTER AREA

| Effective Filter Area<br>385 sq mm |                    | Effective Filter Area<br>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                 |
| 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                              | 8                  | 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                  |

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 655 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 re-orienting 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.

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<sup>2</sup> in an area of 0.057 mm<sup>2</sup> (nominally 10 200-mesh grid openings) and a maximum of 53 s/mm<sup>2</sup> 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

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<sup>2</sup> in an area of 0.057 s/mm<sup>2</sup> (nominally 10 200-mesh grid openings) with no more than one single preparation to exceed 53 s/mm<sup>2</sup> 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  $\mu$ L 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

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  $\mu\text{m}$  (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 $\times$ 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

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 |      |
|    |               |                 |        |        |                |       |         |         |      |
|    |               |                 |        |        |                |       |         |         |      |
|    |               |                 |        |        |                |       |         |         |      |
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|    |               |                 |        |        |                |       |         |         |      |
|    |               |                 |        |        |                |       |         |         |      |

| GO | Structure No. | Structure Type* | Length |        | ED Observation |       |         |         | EDAX |
|----|---------------|-----------------|--------|--------|----------------|-------|---------|---------|------|
|    |               |                 | < 5µm  | ≥ 5 µm | Chrys.         | Amph. | Nonasb. | Neg. ID |      |
|    |               |                 |        |        |                |       |         |         |      |
|    |               |                 |        |        |                |       |         |         |      |
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|    |               |                 |        |        |                |       |         |         |      |

\*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 pre-determined 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.

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.



(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<sup>2</sup> 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<sup>2</sup> concentration. (Generally speaking, the first 4 amphiboles would require EDXA.)

ii. Can be used alone to confirm chrysotile after the 70 s/mm<sup>2</sup> concentration has been exceeded.

iii. Can be used alone to confirm all non-asbestos.

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 non-asbestos class would cause the analysis to exceed the 70 s/mm<sup>2</sup> concentration, their identities must be confirmed by EDXA or measurement of a zone axis diffraction pattern to establish that the particles are non-asbestos.

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<sup>3</sup> is reached.

1. 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.

TABLE II--EXAMPLE LABORATORY LETTERHEAD

| Laboratory I.D. | Client I.D. | FILTER MEDIA DATA |              |                                 |               | Analyzed Area, mm <sup>2</sup> | Sample Volume, cc |
|-----------------|-------------|-------------------|--------------|---------------------------------|---------------|--------------------------------|-------------------|
|                 |             | Type              | Diameter, mm | Effective Area, mm <sup>2</sup> | Pore Size, μm |                                |                   |
|                 |             |                   |              |                                 |               |                                |                   |
|                 |             |                   |              |                                 |               |                                |                   |
|                 |             |                   |              |                                 |               |                                |                   |
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|                 |             |                   |              |                                 |               |                                |                   |
|                 |             |                   |              |                                 |               |                                |                   |

INDIVIDUAL ANALYTICAL RESULTS

| Laboratory I.D. | Client I.D. | # Asbestos Structures | Analytical Sensitivity, s/cc | CONCENTRATION              |               |
|-----------------|-------------|-----------------------|------------------------------|----------------------------|---------------|
|                 |             |                       |                              | Structures/mm <sup>2</sup> | Structures/cc |
|                 |             |                       |                              |                            |               |
|                 |             |                       |                              |                            |               |
|                 |             |                       |                              |                            |               |
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|                 |             |                       |                              |                            |               |
|                 |             |                       |                              |                            |               |
|                 |             |                       |                              |                            |               |

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.



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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 sam-

pling 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:

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," 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 Elec-

tron 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<sup>2</sup> of filter, the response action

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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.

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 work-site 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,

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 as-

urance 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

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 lock-out; 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.

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

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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 provider's 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



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

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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 state-

ment 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

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 situ-

ations 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 non-asbestos 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

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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)
- *Centrifuge* (optional)
- *Filtration apparatus* (optional)
- *Low temperature asher* (optional)

### 1.6 Reagents

#### 1.6.1 Sample Preparation

- *Distilled Water* (optional)
- *Dilute CH<sub>3</sub>COOH*: ACS reagent grade (optional)
- *Dilute HCl*: ACS reagent grade (optional)
- *Sodium metaphosphate* (NaPO<sub>3</sub>)<sub>6</sub> (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

TABLE 1-1—OPTICAL PROPERTIES OF ASBESTOC FIBERS—Continued

| Mineral                               | Morphology, color <sup>a</sup>   | Refractive indices <sup>b</sup> |  | Birefringence | Extinction  | Sign of elongation |
|---------------------------------------|--|---------------------------------|--|---------------|---|--------------------|
|                                       |  | $\alpha$                        | $\gamma$   |               |   |                    |
| 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 <sup>3e</sup> (normally close to 1.700). | .014–.016     | to fiber length.  | – (length fast)    |
| Anthophyllite-asbestos.               | Straight fibers and acicular cleavage fragments. <sup>d</sup> Some composite fibers. Aspect ratio <10:1. Colorless to light brown.                   | 1.596–1.652                     | 1.615–1.676 <sup>f</sup> .                           | .019–.024     | to fiber length.  | + (length slow)    |
| Tremolite-actinolite-asbestos.        | Normally present as acicular or prismatic cleavage fragments. <sup>d</sup> Single crystals predominate, aspect ratio <10:1. Colorless to pale green. | 1.599–1.668                     | 1.622–1.688 <sup>f</sup> .                           | .023–.020     | Oblique extinction, 10–20° for fragments. Composite fibers show   extinction. | + (length slow)    |

<sup>a</sup>From reference 5; colors cited are seen by observation with plane polarized light.

<sup>b</sup>From references 5 and 8.

<sup>c</sup>Fibers subjected to heating may be brownish.

<sup>d</sup>Fibers defined as having aspect ratio >3:1.

<sup>e</sup>to fiber length.

<sup>f</sup>to fiber length.

TABLE 1-2—CENTRAL STOP DISPERSION STAINING COLORS<sup>a</sup>

| Mineral                     | RI Liquid             | $\eta$                     | $\eta  $             |
|-----------------------------|-----------------------|----------------------------|----------------------|
| Chrysotile .....            | 1.550 <sup>HD</sup>   | Blue .....                 | Blue-magenta         |
| Amosite .....               | 1.680                 | Blue-magenta to pale blue. | Golden-yellow        |
|                             | 1.550 <sup>HD</sup>   | Yellow to white.           | Yellow to white      |
| Crocidolite <sup>b</sup> .. | 1.700                 | Red magenta                | Blue-magenta         |
|                             | 1.550 <sup>HD</sup>   | Yellow to white.           | Yellow to white      |
| Anthophyllite               | 1.605 <sup>HD</sup>   | Blue .....                 | Gold to gold-magenta |
| Tremolite .....             | 1.605 <sup>HD c</sup> | Pale blue .....            | Gold                 |
| Actinolite .....            | 1.605 <sup>HD</sup>   | Gold-magenta to blue.      | Gold                 |
|                             | 1.630 <sup>HD c</sup> | Magenta .....              | Golden-yellow        |

<sup>a</sup> From reference 9.

<sup>b</sup> Blue absorption color.

<sup>c</sup> 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 ≤ 3, report "<1% asbestos".

The value reported should be rounded to the nearest percent.

#### 1.8 References

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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,<sup>7,8</sup> 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 (absorption 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,<sup>9</sup> 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.<sup>10</sup> 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 by 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.<sup>8</sup>
- 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, adequate 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<sub>4</sub> · 2H<sub>2</sub>O)
- 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<sub>4</sub> · 2H<sub>2</sub>O)
- Quartz
- \*Organic binders and thickeners
- Hydromagnesite
- Wollastonite
- Opaques (chromite, magnetite inclusions in serpentine)
- Hematite (inclusions in "amosite")

recently directed a major research effort toward the preparation and characterization of analytical reference materials, including asbestos standards;<sup>16,17</sup> 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.<sup>18</sup> 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- $\mu$ m pore size. Selas Corp. of America, Flotronics Div., 1957 Pioneer Road, Huntingdon 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*:  $\alpha$ -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.



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° 2 $\theta$ /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° 2 $\theta$ ; 1° 2 $\theta$ /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<sup>3</sup> 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  $\mu$ m 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 2 $\theta$  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.<sup>5</sup> A thick-layer or bulk method involving pelletizing the sample may be used for semiquantitative analysis;<sup>7,8</sup> 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° 2 $\theta$  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

$$R = \frac{\sin \theta_{Ag}}{\sin \theta_a}$$

$\theta_{Ag}$ =angular position of the measured silver peak (from Bragg's Law), and  
 $\theta_a$ =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:

$$P_a = \frac{W_a(1-0.1L)}{W_T} \times 100$$

where

$P_a$ =percent asbestos mineral in parent material;

$W_a$ =mass of asbestos mineral on filter, in  $\mu\text{g}$ ;

$W_T$ =total sample weight on filter, in  $\mu\text{g}$ ;

$L$ =percent weight loss of parent material on ashing and/or acid treatment (see Section 2.7.2.3).

### 2.10 References

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18. Personal communication, A. M. Langer, Environmental Sciences Laboratory, Mount

(2) *What action will EPA take on my State's application for an exemption?* EPA will review your State's application and make a preliminary determination whether your State's asbestos worker protection plan meets the requirements of TSCA section 18.

(i) If EPA's preliminary determination is that your State's plan does meet the requirements of TSCA section 18, EPA will initiate a rulemaking, including an opportunity for public comment, to exempt your State from the requirements of this subpart. After considering any comments, EPA will issue a final rule granting or denying the exemption.

(ii) If EPA's preliminary determination is that the State plan does not meet the requirements of TSCA section 18, EPA will notify your State in writing and will give your State a reasonable opportunity to respond to that determination.

(iii) If EPA does not grant your State an exemption, then the State and local government employers in your State are subject to the requirements of this subpart.

(b) *States that have been granted an exemption.* If EPA has exempted your State from the requirements of this subpart, your State must update its asbestos worker protection regulations as necessary to implement changes to meet the requirements of this subpart, and must apply to EPA for an amendment to its exemption.

(1) *What must my State do to apply for an amendment to its exemption?* To apply for an amendment to its exemption, your State must send to the Director of OPPT a copy of its updated asbestos worker protection regulations and a detailed explanation of how your State's updated asbestos worker protection plan meets the requirements of TSCA section 18. Your State must submit its application for an amendment within 6 months of the effective date of any changes to the requirements of this subpart, or within a reasonable time agreed upon by your State and OPPT.

(2) *What action will EPA take on my State's application for an amendment?* EPA will review your State's application for an amendment and make a preliminary determination whether your

State's updated asbestos worker protection plan meets the requirements of TSCA section 18.

(i) If EPA determines that the updated State plan does meet the requirements of TSCA section 18, EPA will issue your State an amended exemption.

(ii) If EPA determines that the updated State plan does not meet the requirements of TSCA section 18, EPA will notify your State in writing and will give your State a reasonable opportunity to respond to that determination.

(iii) If EPA does not grant your State an amended exemption, or if your State does not submit a timely request for amended exemption, then the State and local government employers in your State are subject to the requirements of this subpart.

### Subpart H [Reserved]

### Subpart I—Prohibition of the Manufacture, Importation, Processing, and Distribution in Commerce of Certain Asbestos-Containing Products; Labeling Requirements

SOURCE: 54 FR 29507, July 12, 1989, unless otherwise noted.

#### § 763.160 Scope.

This subpart prohibits the manufacture, importation, processing, and distribution in commerce of the asbestos-containing products identified and at the dates indicated in §§ 763.165, 763.167, and 763.169. This subpart requires that products subject to this rule's bans, but not yet subject to a ban on distribution in commerce, be labeled. This subpart also includes general exemptions and procedures for requesting exemptions from the provisions of this subpart.

#### § 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.

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.

[59 FR 33208, June 28, 1994]

**§ 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.

[59 FR 33209, June 28, 1994]

**§ 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 § 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 § 763.165(b).

[59 FR 33209, June 28, 1994]

**§ 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 § 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 § 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.

[59 FR 33209, June 28, 1994]

**§ 763.171 Labeling requirements.**

(a) After August 27, 1990, manufacturers, importers, and processors of all asbestos-containing products that are identified in § 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 § 763.165(b), shall label the products as specified in this subpart at the time of manufacture, import, or processing. This requirement includes

## Environmental Protection Agency

## § 763.173

(4) Applications for products affected by the ban under § 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 § 763.169 for a product at the same time the applicant submits an application for an exemption from a ban under § 763.165 or § 763.167 for that product. EPA will grant an exemption at that time from a ban under § 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, 1200 Pennsylvania Ave., NW., Washington, DC

20460, ATTENTION: Asbestos Exemption. For information regarding the submission of exemptions containing information claimed as confidential business information (CBI), see § 763.179.

(d) Content of application and criteria for decisionmaking.

(1) Content of application. Each application must contain the following:

(i) Name, address, and telephone number of the applicant.

(ii) Description of the manufacturing, import, processing, and/or distribution in commerce activity for which an exemption is requested, including a description of the asbestos-containing product to be manufactured, imported, processed, or distributed in commerce.

(iii) Identification of locations at which the exempted activity would take place.

(iv) Length of time requested for exemption (maximum length of an exemption is 4 years).

(v) Estimated amount of asbestos to be used in the activity that is the subject of the exemption application.

(vi) Data demonstrating the exposure level over the life cycle of the product that is the subject of the application.

(vii) Data concerning:

(A) The extent to which non-asbestos substitutes for the product that is the subject of the application fall significantly short in performance under necessary product standards or requirements, including laws or ordinances mandating product safety standards.

(B) The costs of non-asbestos substitutes relative to the costs of the asbestos-containing product and, in the case in which the product is a component of another product, the effect on the cost of the end use product of using the substitute component.

(C) The extent to which the product or use serves a high-valued use.

(viii) Evidence of demonstrable good faith attempts by the applicant to develop and use a non-asbestos substance or product which may be substituted for the asbestos-containing product or the asbestos in the product or use that is the subject to the application.

(ix) Evidence, in addition to that provided in the other information required with the application, showing that the continued manufacture, importation,

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## § 763.179

to or copying of records as required by section 11 of the Act (15 U.S.C. 2610) is a violation of section 15 of the Act (15 U.S.C. 2614).

(c) Failure or refusal to permit entry or inspection as required by section 11 of the Act (15 U.S.C. 2610) is a violation of section 15 of the Act (15 U.S.C. 2614).

(d) Violators may be subject to the civil and criminal penalties in section 16 of the Act (15 U.S.C. 2615) for each violation.

(e) The Agency may seek to enjoin the manufacture, import, processing, or distribution in commerce of asbestos-containing products in violation of this subpart, or act to seize any asbestos-containing products manufactured, imported, processed, or distributed in commerce in violation of this subpart, or take any other actions under the authority of section 7 or 17 of the Act (15 U.S.C. 2606 or 2616) that are appropriate.

### § 763.176 Inspections.

The Agency will conduct inspections under section 11 of the Act (15 U.S.C. 2610) to ensure compliance with this subpart.

### § 763.178 Recordkeeping.

(a) *Inventory.* (1) Each person who is subject to the prohibitions imposed by §§ 763.165 and 763.167 must perform an inventory of the stock-on-hand of each banned product as of the effective date of the ban for that product for the applicable activity.

(2) The inventory shall be in writing and shall include the type of product, the number of product units currently in the stock-on-hand of the person performing the inventory, and the location of the stock.

(3) Results of the inventory for a banned product must be maintained by the person for 3 years after the effective date of the § 763.165 or § 763.167 ban on the product.

(b) *Records.* (1) Each person whose activities are subject to the bans imposed by §§ 763.165, 763.167, and 763.169 for a product must, between the effective date of the § 763.165 or § 763.167 ban on the product and the § 763.169 ban on the product, keep records of all commercial transactions regarding the product, including the dates of purchases

and sales and the quantities purchased or sold. These records must be maintained for 3 years after the effective date of the § 763.169 ban for the product.

(2) Each person who is subject to the requirements of § 763.171 must, for each product required to be labeled, maintain a copy of the label used in compliance with § 763.171. These records must be maintained for 3 years after the effective date of the ban on distribution in commerce for the product for which the § 763.171 requirements apply.

[54 FR 29507, July 12, 1989, as amended by 54 FR 46898, Nov. 8, 1989; 58 FR 34205, June 23, 1993]

### § 763.179 Confidential business information claims.

(a) Applicants for exemptions under § 763.173 may assert a Confidential Business Information (CBI) claim for information in an exemption application or supplement submitted to the Agency under this subpart only if the claim is asserted in accordance with this section, and release of the information would reveal trade secrets or confidential commercial or financial information, as provided in section 14(a) of the Act. Information covered by a CBI claim will be treated in accordance with the procedures set forth in 40 CFR part 2, subpart B. The Agency will place all information not claimed as CBI in the manner described in this section in a public file without further notice to the applicant.

(b) Applicants may assert CBI claims only at the time they submit a completed exemption application and only in the specified manner. If no such claim accompanies the information when it is received by the Agency, the information may be made available to the public without further notice to the applicant. Submitters that claim information as business confidential must do so by writing the word "Confidential" at the top of the page on which the information appears and by underlining, circling, or placing brackets ([ ]) around the information claimed CBI.

(c) Applicants who assert a CBI claim for submitted information must provide the Agency with two copies of their exemption application. The first copy must be complete and contain all

**SECTION 8**

**ASBESTOS MANAGEMENT IN SCHOOLS DOCUMENT**

**AHERA ASBESTOS MANAGEMENT PLAN**

**SELF AUDIT CHECKLIST**

11-710-0-70-001

United States  
Environmental Protection  
Agency

Region IV  
1200 Sixth Avenue  
Seattle WA 98101

UNITED  
E-23

Idaho  
Oregon  
Washington

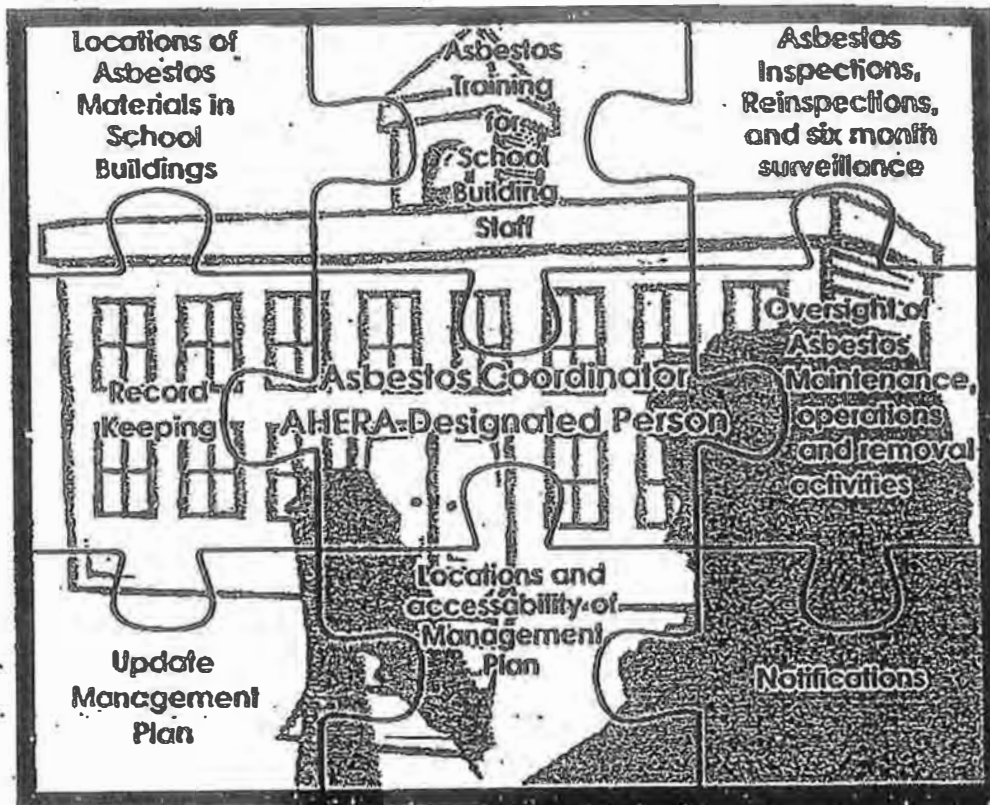
Office of Waste and Chemical Management

January 1986



# How to Manage Asbestos in School Buildings

## AHERA Designated Person's Self-study Guide





This manual is recommended for persons recently appointed to the position of AHERA Designated Person, as well as persons who have held the position for some time. *To determine whether reviewing this document would satisfy the training requirements for the DP, school personnel should consult with the regional asbestos coordinator in the EPA Regional Office serving their state.* For the name and telephone of the local Regional Asbestos Coordinator, contact the EPA Toxics Substances Control Act (TSCA) Hotline at (202) 554-1404.

The U.S. Environmental Protection Agency (EPA) strives to provide accurate, complete, and useful information. The information contained in the manual is the best available information as of December 1995; however, with new regulations, technology, and interpretations, this information is subject to change. It is up to the reader to keep current with the subject matter. Neither the United States government, the EPA, nor any of their employees makes any warranty, express or implied, or assumes any legal liability regarding the use of information provided in this manual. The information is offered for educational purposes only and shall not be construed to create any rights, substantive or procedural, not otherwise available by law.

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5. Which of the following are not the responsibility of the Local Education Agency?
- A. must conduct periodic surveillance in each building under its authority at least once every six months and use an accredited inspector to conduct the reinspections every three years
  - B. must attach a warning label immediately adjacent to any friable and nonfriable asbestos-containing building material (ACBM) and suspected ACBM located in routine maintenance areas, such as boiler rooms, at each school building
  - C. must send all notification, inspection, and periodic surveillance records to EPA on an annual basis
  - D. ensure that complete and up-to-date records of inspections, reinspections, response activities, periodic surveillances, and operations and maintenance activities are maintained
  - E. must comply with the notification requirements to workers, students, building occupants, parents, and short-term workers
6. Which activities must be conducted by an accredited inspector?
- A. Identify all homogeneous areas of material that are suspected to contain asbestos
  - B. Gather information on the uses and functions of the spaces within the homogeneous areas
  - C. Collect samples of material suspected to be ACBM and send them to the lab for analysis
  - D. Perform a physical assessment of the material and document the results in an inspection report
  - E. All of the above activities
7. Some of the most common uses of asbestos-containing building materials found include:
- A. Fireproofing on structural members
  - B. Plaster, pipe and boiler insulation
  - C. Acoustical or sound proofing material
  - D. Flooring and ceiling tiles
  - E. All of the above
8. In addition to imposing other requirements, the Asbestos Hazard Emergency Response Act requires that a Local Education Agency:
- A. Close buildings in which asbestos is found
  - B. Perform inspections to identify asbestos-containing building materials in its buildings
  - C. Notify the Environmental Protection Agency on the locations of asbestos-containing building materials in the schools of the district
  - D. Remove all asbestos-containing building materials from its buildings
  - E. B and D

13. A designated person must:
- A. Receive training that provides basic knowledge of a number of asbestos-related subjects, as listed in EPA's asbestos regulations
  - B. Complete EPA-or State-approved inspector course and become accredited
  - C. Have a college degree
  - D. Pass an EPA test on Designated Person roles and responsibilities
  - E. Complete no training
14. An asbestos management program is subject to which EPA statutes and regulations:
- A. Asbestos Hazard Emergency Response Act
  - B. Asbestos Hazard Emergency Response Act, National Emissions Standards for Hazardous Air Pollutants
  - C. Asbestos Hazard Emergency Response Act, National Emissions Standards for Hazardous Air Pollutants, EPA Worker Protection Rule
  - D. Asbestos Hazard Emergency Response Act, National Emissions Standards for Hazardous Air Pollutants, EPA Worker Protection Rule and Asbestos School Hazard Abatement Reauthorization Act
  - E. None of these
15. Local Education Agencies must conduct the following notifications:
- A. annually to parents, teachers, and employee organizations on the availability of the asbestos management plan
  - B. annually to workers, building occupants and their guardians on recent or planned asbestos activities (such as inspections, response action, etc.)
  - C. to short-term workers (e.g. telephone repair workers, utility workers, or exterminators) who may come into contact with asbestos on the locations of asbestos-containing building materials (or assumed ACBM)
  - D. annually to EPA or state agencies on updates to the management plan.
  - E. A, B, C
16. The management plan must:
- A. be kept in the Local Education Agency's administrative office
  - B. be kept in the administrative office of each school building
  - C. be available to persons for inspection without cost or restriction
  - D. be complete and up-to-date
  - E. all of the above

(1) A (2) D (3) A (4) B (5) C (6) E (7) E (8) B (9) A (10) C (11) E  
(12) A (13) A (14) D (15) E (16) E

## CHAPTER 1

### Using the Self-Study Guide

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asbestos programs. Shortly after, EPA hired a contractor to develop the *Designated Person Self-Study Guide*. Due to the shortage of funding, this project was abandoned in 1992.

Over the past seven years, EPA staff have observed that the quality of school asbestos programs depend heavily on the dedication and work of the AHERA Designated Person (DP). Schools without a competent DP tend to have more AHERA violations. Common violations are listed on the table "Frequent Problems with the Management Plan" on page 47. Schools with DPs who know the AHERA requirements can effectively prevent the release of asbestos fibers through their own actions, as well as their ability to hire and oversee the work of personnel conducting asbestos-related activities at their school buildings.

The *AHERA Designated Person Self Study Guide* is an important tool to improve LEA's compliance with AHERA and to protect the health of school building occupants through preventing the release of asbestos fibers. With the support from EPA HQ and all the other EPA regional offices, the Seattle office of EPA undertook the task of updating and finalizing this manual on August 1995.

#### *Responsibilities of the AHERA Designated Person*

The responsibilities of the AHERA Designated Person include:

- ensure that all activities of anyone who conducts the following are carried out in accordance with the AHERA requirements: conduct inspections, reinspections, periodic surveillance; develops, implements and updates management plans; and plans and implements asbestos-related activities (such as maintenance or removal);
- ensure that all custodial and maintenance employees are properly trained;
- ensure that all workers, building occupants, students, and their parents are notified annually about management plan availability and recent and upcoming asbestos-related activities;
- ensure that short-term workers who may come into contact with asbestos are provided information regarding the location of this asbestos;
- ensure that all warning labels are posted; and
- consider any conflicts of interest that may arise when selecting accredited personnel to conduct asbestos-related activities.

#### *AHERA Designated Person Required Training*

AHERA requires that the DP be *adequately* trained to carry out his or her responsibilities. Due to the differing needs of school districts based on the size of the district and the amount and condition of the ACBM, AHERA does not list a specific training course or specific number of hours of training for the DP. Further, AHERA does not require the DP to be accredited.

Specifically, the regulations note the training must include the following topics:

- health effects of asbestos;
  - detection, identification and assessment of asbestos-containing building materials (ACBM);
  - options for controlling asbestos-containing building materials; and
  - asbestos management programs.
- relevant Federal and State regulations concerning asbestos, including AHERA and its implementing regulations and the regulations of the Occupational Safety and Health

## CHAPTER 1

### Using the Self-Study Guide

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A designated person may also wish to refer to one or more of the following EPA documents in completing this guide:

- Environmental Protection Agency  
40 CFR Part 61; *National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP Revision*; Final Rule (November 20, 1990);  
  
*Guidance for Controlling Asbestos-Containing Materials in Buildings (Purple Book)*:  
(June, 1985; 560/5-85-024);  
  
*Managing Asbestos in Place: A Building Owners Guide to Operations and Maintenance Programs for Asbestos-Containing Materials (Green Book)* (July, 1990; 20T-2003);  
  
*Asbestos in Buildings; Guidance for Service and Maintenance Personnel*  
(June 1985; 560/5-85-018);  
  
*A Guide to Performing Reinspections Under the Asbestos Hazard Emergency Response Act (AHERA) (Yellow Book)* (February 1992);  
  
*Answers to the Most Frequently Asked Questions About Reinspections Under AHERA*  
(May 1991);  
  
*Environmental Hazards in Your School: A Resource Handbook* (October 1990).  
  
Policy Clarification for the Asbestos Hazard Emergency Response Act: *Under What Circumstances is Removal of Vinyl Asbestos Tile or Similar Materials a Response Action under AHERA?* (EPA, July 1992).

To obtain any of the documents listed above, contact the EPA Toxic Substances Control Act (TSCA) Hotline at (202) 554-1404 or the U.S. Government Printing Office.

## CHAPTER 2

### An Introduction to Asbestos

---

temperature insulation products and on chemical resistant surfaces, such as laboratory tables for chemistry and biology classes (upon occasion, the custodial staff will drill holes in table tops for new fixtures without realizing that the material may contain crocidolite. The remaining three types of asbestos in the amphibole group -- Anthophyllite, Tremolite, and Actinolite -- are rare and have little commercial value. They are occasionally found as contaminants or minor constituents in asbestos-containing materials.

### Uses of Asbestos

Asbestos has been used in thousands of products, largely because it is plentiful, readily available, cheap, strong, does not burn, conducts heat and electricity poorly, and is resistant to chemical corrosion. Products made with asbestos are often referred to as asbestos-containing materials (ACM).

Asbestos proved particularly useful in the construction industry. Building materials that contain asbestos are referred to as asbestos-containing building materials (ACBM). Commercial usage of asbestos products in the construction industry was most common from about 1945 to 1980. Some of the most common uses of ACBM include:

- **Fireproofing material** -- Usually spray-applied to steel beams used in construction of multi-story buildings to prevent structural members from warping or collapsing in the event of fire.
- **Insulation material** -- Usually spray-applied, trowel-applied, or manually installed after being preformed to fit surfaces such as pipes for thermal insulation and condensation control.
- **Acoustical or soundproofing material** -- Trowel- or spray-applied. May also be used for decoration. Asbestos was mixed with other materials and sprayed onto ceilings and walls to produce a soft, textured look.
- **Miscellaneous materials** -- Asbestos has been added to asphalt, vinyl, cement and other materials to make products like roofing felts, exterior siding and roofing shingles, wallboard, pipes for water supply, combustion vents, and flues for waste gases and heat. Fibers in asbestos cement, asphalt, and vinyl materials are usually firmly bound into materials in good condition and typically will be released only if the material is damaged mechanically -- for example through drilling, cutting, grinding, or sanding. In addition, asbestos in roofing shingles and siding exposed to weathering may slowly deteriorate and has the potential to release fibers.

Examples of the more common ACBM found in schools are flooring, vinyl base, mastic, roofing materials, gaskets in heating and air-conditioning equipment, ceiling panels and tiles, wallboard, joint compound, plaster, pipe and boiler insulation, duct-wrap insulation, duct joint tape, duct vibration dampening cloth, fireproofing on structural members, fire brick for boilers, fire doors, acoustical spray-on, cement pipes, and panels.

Chapter 2 Summary  
Key Points About Asbestos

This chapter introduces some important terms used in the AHERA Rule. The designated person should be especially familiar with the following:

**Asbestos-Containing Material (ACM)** -- Any material or product that contains more than one percent asbestos.

**Asbestos-Containing Building Material (ACBM)** -- 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.

**Friable ACBM** -- Material that may be crumbled, pulverized, or reduced to powder by hand pressure when dry. Friable ACBM also includes previously nonfriable material when it becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

**Nonfriable ACBM** -- Material that, when dry, may not be crumbled, pulverized, or reduced to powder by hand pressure.

**Surfacing ACM** -- Interior ACM that has been sprayed on, troweled on, or otherwise applied to surfaces (structural members, walls, ceilings, etc.) for acoustical, decorative, fireproofing, or other purposes.

**Thermal System ACM** -- Insulation used to control heat transfer or prevent condensation on pipes and pipe fittings, boilers, breeching, tanks, ducts, and other parts of hot and cold water systems; heating, ventilation, and air-conditioning (HVAC) systems; or other mechanical systems.

**Miscellaneous ACM** -- Other, mostly nonfriable, products and materials (found on structural components, structural members or fixtures) such as floor tile, ceiling tile, construction mastic for floor and ceiling materials, sheet flooring, fire doors, asbestos cement pipe and board, wallboard, acoustical wall tile, and vibration damping cloth.

*Undamaged non-friable ACBM should be treated as friable if any action performed would render these materials friable. When previously non-friable ACBM becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure, it should be treated as friable.*



### The Respiratory System

The effects of asbestos exposure most often involve the lungs. Air breathed into the body passes through the mouth and nose, continuing into the windpipe. The windpipe divides into smaller and smaller tubes that end up in the lungs as air sacs called alveoli. It is in these air sacs that respiration occurs. Oxygen is absorbed into tiny blood vessels (or capillaries), and waste gases, such as carbon dioxide, pass out of the blood and are exhaled.

The body has several mechanisms to "filter" the air it breathes. First, large particles are removed in the nose and mouth. Many smaller particles are caught on the mucus-coated walls of the airway tubes. These airways have "hairy" linings (ciliate cells) that constantly propel mucus upward. Particles caught in the mucus are swept up into the back of the mouth. From here they are swallowed or expelled (spit out). Unfortunately, cigarette smoking temporarily paralyzes these hair-like cells, disabling one of the body's natural defenses against unwanted dust or fibers.

Despite natural bodily defenses, some dust particles inevitably reach the tiny air sacs in the lungs. When this occurs the human immune system dispatches large cells called macrophages to engulf the particles and "digest" them. These cells deposit a coating on the particles and may begin forming scar tissue around them. This is just another natural defense mechanism the body uses against unwanted debris in the lungs.

### Asbestos-Related Diseases

If the body's defenses fail to control or remove asbestos fibers that enter the lungs, the risk of developing an asbestos-related disease increases. Asbestos-related diseases include asbestosis, lung cancer, mesothelioma, and other cancers.

- **Asbestosis** -- Asbestosis is a disease characterized by lung scarring. It reduces lung elasticity -- the ability to inhale and exhale in response to muscular contractions of the diaphragm -- and makes breathing very difficult. Asbestosis is most common among workers who have been exposed to large amounts of asbestos fibers over a period of time. It is a serious disease and, in those persons exposed to high levels of asbestos, can eventually lead to disability or death. All forms of asbestos are suspected to have the potential to cause asbestosis. Like all diseases associated with asbestos exposure, it may take many years for the disease to show up. The typical latency period for asbestosis is 15 to 30 years. Available data indicate that the frequency of occurrence of asbestosis rises and the disease worsens with increasing dust exposure. The Occupational Safety and Health Administration (OSHA) Asbestos Standards were developed to minimize the incidence of asbestosis among asbestos workers by reducing their exposure to asbestos.
- **Lung Cancer** -- As with asbestosis, there appears to be a dose-response relationship between asbestos exposure and lung cancer. In addition, lung cancer arising from

### EPA Policy for Asbestos Control in Schools

EPA bases its policy for asbestos control in schools on the following premises:

- Although asbestos is hazardous, the risk of asbestos-related disease depends upon exposure to airborne asbestos fibers.
- 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.
- 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.
- EPA only requires asbestos removal to prevent significant public exposure to airborne asbestos fibers during building demolition or renovation activities.
- Asbestos that has been identified will pose little risk if it is well maintained under an operations and maintenance program. Improper operations and maintenance also can cause dangerous situations. Therefore, EPA requires a pro-active, in-place management program whenever ACM is discovered and is not removed.

# 4 WHAT IS REQUIRED OF THE LEA?

## Scope and Purpose of AHERA

Broadly stated, AHERA requires that each Local Education Agency (LEA) perform inspections to identify asbestos-containing materials in each of the public and private elementary and secondary schools under its authority; develop, implement and update asbestos management plans; take appropriate response actions; safely maintain asbestos-containing building materials (ACBM); and comply with AHERA's recordkeeping requirements.

The AHERA Rule outlines the general responsibilities of a LEA in § 763.84 and the specific duties of the LEA in the succeeding sections of the rule.

## General LEA Responsibilities

Under § 763.84 of the AHERA Rule, the LEA has the following general responsibilities:

- Ensure that the activities of any persons who perform inspections, reinspections, and periodic surveillance, develop and update management plans, develop and implement response actions, and conduct operations and maintenance activities are in compliance with all of the AHERA requirements.
- Ensure that all custodial and maintenance workers are properly trained.
- Ensure that workers and building occupants or their legal guardians are notified at least annually about activities relating to ACBM.
- Ensure that short-term workers who may come in contact with asbestos in a school are provided the locations of ACBM and suspected ACBM assumed to be ACBM.
- Ensure that warning labels are properly posted.
- Ensure that management plans are available for inspection.

## CHAPTER 4

### What is Required of the LEA?

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- **Assessment** -- For each inspection and reinspection, an accredited inspector must provide a written assessment of all friable known or assumed ACBM in the school building.
- **Management Plans** -- Each LEA must complete an asbestos management plan for each school under its authority. An accredited management planner must prepare the management plan based on the results of the inspection. In the management plan, the management planner recommends appropriate response actions, prepares cost estimates on the response actions, and schedules the response actions. The management plan must be updated on a timely basis.
- **Response Actions** -- Based on the recommendations of the management planner, the LEA must select the appropriate response actions consistent with the assessment of the ACBM. The designated person must see to it that the response actions are carried out in a timely manner and in compliance with the AHERA requirements. "Timely manner" is not defined in the regulations but involves the joint development of a schedule for plan implementation by the management planner and the designated person. Only accredited laboratories may be used to perform final clearance air sample analyses.
- **Operations and Maintenance** -- The LEA must implement an operations and maintenance (O&M) program whenever any friable ACBM is present or assumed to be present in a building under its authority. Where material identified as nonfriable ACBM or nonfriable assumed ACBM is about to become friable as a result of activities performed in the building, it must be treated as friable and thus must also be subject to an O&M program. EPA recommends that the LEA also manage nonfriable ACBM in their school buildings under an O&M program.
- **Training** -- AHERA requires that building inspectors, management planners, project designers, contractors/supervisors, and asbestos workers be accredited before they can perform asbestos-related activities. The AHERA regulations details specific training requirements for the designated person and for custodial and maintenance workers, although these individuals are not required to complete any EPA-approved courses or receive accreditation.
- **Notification** -- The LEA must issue the following notifications regarding asbestos identified in its schools:
  - An annual notice to all workers and building occupants, or their legal guardians, of all inspections, reinspections, and activities being conducted to control asbestos exposure, including periodic surveillance and asbestos removal, that are planned or in progress. This notification should be documented in the management plan.
  - An annual written notice informing parent, teacher, and employee

Chapter 4 Summary  
Key Points About LEA Responsibilities

The LEA must have an accredited inspector conduct **inspections** of each school building under its authority. A **reinspection** of all friable and nonfriable known or assumed ACBM in each school building must be conducted at least once every three years that a management plan is in effect. A management planner must review all three year inspection reports.

For each inspection and reinspection, an accredited inspector must provide a written **assessment** of all friable known or assumed ACBM in the school building.

The LEA must have an accredited management planner review the results of the inspection/reinspection and the assessment and make written recommendations on appropriate response actions. The accredited management planner also prepares the asbestos **management plan** for each school under its authority.

The LEA must select the appropriate **response actions** consistent with the assessment of the ACBM and the recommendations of the management planner.

The LEA must implement an **operations and maintenance (O&M) program** whenever any friable ACBM is present or assumed to be present in a building under its authority.

Building inspectors, management planners, project designers, contractors/ supervisors, and asbestos workers must complete EPA- or State-approved courses and receive accreditation before they can perform any asbestos-related activities. The AHERA Rule also specifies training requirements for LEA designated persons and custodial and maintenance workers, although these individuals are not required to complete any EPA-approved courses or receive accreditation.

The LEA must conduct **periodic surveillance** in each building under its authority at least once every six months after a management plan is in effect.

The LEA must comply with the requirements to provide **notification** about asbestos activities to workers, students, parents, teachers, and short-term workers.

The LEA must maintain **records** in accordance with the AHERA regulations.

The LEA must attach a **warning label** immediately adjacent to any friable and nonfriable ACBM and assumed ACBM located in routine maintenance areas (such as boiler rooms) at each school building.

# 5 THE AHERA INSPECTION

## Introduction

An AHERA inspection must be conducted by an "accredited inspector," *i.e.*, one who has attended and successfully completed a course approved by EPA or an EPA-approved State program, passed an exam and received an accreditation number and certificate. This accreditation must be updated annually. Once an AHERA inspection is complete, the inspector must submit the results to the LEA in an inspection report. There are two elements to an AHERA inspection: identification and physical assessment.

## Identification of ACBM

The initial inspection to identify all the ACBM in a building begins with locating and listing all "homogeneous areas" of material that are suspected to contain asbestos. A "homogeneous area" is an area of surfacing material, thermal system insulation, or miscellaneous material that is uniform in color and texture. Suspected ACBM in a homogeneous area or functional space must then be treated as ACBM unless samples are taken and the sample analyses show the material to be non-asbestos. "Functional space" means 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 Areas

As was discussed in Chapter 2, interior materials suspected of containing asbestos must be categorized as one of the following three types:

- Surfacing Materials
- Thermal System Insulation (TSI)
- Miscellaneous Materials

Once a material is classified as a particular type, the inspector should identify areas where the materials are all of one type.

Note, EPA suggests that wings or additions added to a building should not be considered homogeneous with the original structure. Building materials used in different buildings should not be considered homogeneous. If there is any reason to suspect that materials

Table 5-1

| Bulk Sampling Requirements  |  |
|---|--|
| Type of Material  | Samples Required   |
| <b>Friable Surfacing Material</b>   |  |
| Area ≤ 1,000 sq. ft.  | 3  |
| Area > 1,000 sq. ft. but ≤ 5,000 sq. ft.  | 5  |
| Area > 5,000 sq. ft.  | 7  |
| <b>Thermal System Insulation (TSI)</b>  |  |
| TSI not assumed to be ACBM  | 3  |
| Patched TSI not assumed to be ACBM (if patched section < 6 linear or sq. ft.)   | 1  |
| Each insulated mechanical system not assumed to be ACBM where cement or plaster is used on fittings such as tees, elbows, or valves | Samples in a manner sufficient to determine if material is or is not ACBM* |
| Friable Miscellaneous Material not Assumed to Be ACBM   | Samples in a manner sufficient to determine if material is or is not ACBM* |
| Nonfriable Suspected ACBM not Assumed to Be ACBM  | Samples in a manner sufficient to determine if material is or is not ACBM* |

\* EPA recommends that three samples be taken to meet this requirement

Note: The designation of ACM for a homogeneous area based on one positive bulk sample result is acceptable.

inspector.

- An accredited inspector has determined that, based on sampling records, nonfriable ACBM was identified in the area during an inspection conducted before December 14, 1987. In such a case, the accredited inspector must identify whether material that was nonfriable has become friable since the previous inspection and must assess the newly friable ACBM.
- Based on sampling records and inspection records, an accredited inspector has determined that no ACBM is present in the area and the records show that the area was sampled before December 14, 1987, in substantial compliance with the AHERA Rule.
- The lead agency responsible for asbestos inspection in a State that has been granted a waiver from the inspection requirements of the AHERA Rule has determined that, based on sampling records and inspection records, no ACBM is present in the area. The records must show that the area was sampled before December 14, 1987, in compliance with the AHERA Rule.
- An accredited inspector has determined that, based on records of an inspection conducted before December 14, 1987, suspected ACBM identified in the area is assumed to be ACBM. In such a case, the inspector must identify whether material that was nonfriable suspected ACBM assumed to be ACBM has become friable since the previous inspection and must assess any newly friable material and previously identified friable suspected ACBM assumed to be ACBM.
- Based on inspection records and contractor and clearance records, an accredited inspector has determined that all ACBM was previously removed from the area.
- 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 no ACBM was used as a building material in the building.

### Physical Assessment

Once the inspector has identified all of the ACBM in a building, he or she must perform a physical assessment of all TSI and friable material. Under § 763.88 of the AHERA Rule, the physical assessment of ACBM involves classifying the material into one of the following seven Physical Assessment Categories:

1. Damaged or significantly damaged thermal system insulation (TSI) ACBM
2. Damaged friable surfacing ACBM



**CHAPTER 5**  
**The AHERA Inspection**

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determine the correct assessment category for material in a functional space (*See the Exercise at the end of this chapter for a brief exercise for determining the correct Physical Assessment Category for a functional space*).

## CHAPTER 5

### The AHERA Inspection

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- Accreditation number of each accredited inspector making the assessment, if applicable

The inspection report should list the required elements in the order in which they are listed above to promote uniformity and ease of comprehension. The inspection report should also contain an introductory summary that briefly explains what will be found in the report. Documentation such as field data sheets and optional photographs should appear in appendices to the report.

*(See the Inspection Report Compliance Checklist at the end of this chapter.)*

#### Common Inspection Report Problems and Deficiencies

The designated person should ensure that the inspection report is complete. *Asbestos in Schools: Evaluation of the Asbestos Hazard Emergency Response Act: A Summary Report* identifies several areas in which inspection reports are often deficient. Examples include:

- Many inspection reports failed either to indicate areas where ACBM were present or did so incompletely.
- Vibration dampening cloth, duct insulation, fire doors and linoleum were not regularly identified as suspect ACBM.
- Eighty-two percent of school buildings had at least one ACBM unidentified in the original AHERA inspection.

The best time to review the inspection report for completeness is during a building walk-through, which is usually performed during the 6 month periodic surveillance inspection. Such problems as missing or confusing warning labels, improper identification of homogeneous areas, incomplete lists of suspect materials, and inaccurate or unclear sample locations may be identified during the walk-through. Correction of problems identified should be started immediately.

The designated person should be aware that an adequate number of samples must be collected in order to determine whether an area is considered asbestos-containing (*See Table 5-1 above*). If an adequate number of samples was not collected, the area must be considered to be ACBM regardless of the results of the analyses. In such a situation, the management planner, who reviewed the inspection/reinspection report, may advise the LEA to either collect additional samples or may update the management plan to assume that the areas in question are ACBM.

Chapter 5 Forms

On the following are blank forms, similar to those used by AHERA accredited inspectors.

**Form 1** requires that the inspector enter information pertaining to homogeneous areas of *suspected and known ACBM* in a school building. Using the inspection report, the inspector will: 1) list all of the homogeneous areas in the school buildings, 2) enter the number of linear or square feet for each area, 3) indicate whether the material is friable or non-friable, 4) enter the type of ACBM that is present, and 5) indicate whether the ACBM is assumed to be ACBM.

**Form 2** requires that the inspector enter information in order to relate each homogeneous area to a functional space. Using the inspection report, the information entered on Form 1, and the building's floor plan, the inspector will 1) link the homogeneous areas to a functional space, 2) assign a number to each homogeneous area, 3) assign a letter to each functional space, and 4) create a key for the numbers and letters that are used.

**Form 3** is representative of a bulk sampling log that should be in the inspection report.

**Form 4** may be used to gather the information needed to show why a certain category was assigned to ACBM.

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**The AHERA Inspection**

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**Example Form 2**

| <b>Functional Spaces/Homogeneous Areas</b>   |  |
|--|--|
| <b>Building:</b> _____<br>_____<br>_____<br>_____                                    |  |
| Functional Space Letter  | Homogeneous Areas by Number (Obtained from Form 1) |
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| <b>Key: L/S = Linear Feet/Square Feet    S/T/M = Surfacing/Thermal/Miscellaneous</b> |  |

Example Form 4

| <b>Individual Assessment Form</b>   |               |                       |                     |
|---|---------------|-----------------------|---------------------|
| <b>AREA #:</b> _____ <b>AHERA CATEGORY #:</b> _____<br><b>DESCRIPTION:</b> _____<br><br><b>1. Location &amp; Amount</b> _____<br>_____<br>_____<br><br><b>2. Condition, Type of Damage:</b> _____<br>_____<br>_____<br><br><b>Severity of Damage:</b> _____<br>_____<br><b>Extent/Spread of Damage:</b> _____<br>_____<br><br><b>3. Accessibility:</b> _____<br>_____<br>_____<br><br><b>4. Potential for Disturbance:</b> _____<br>_____<br>_____<br><br><b>5. Causes of Damage:</b> _____<br>_____<br>_____<br><br><b>6. Preventive Measures:</b> _____<br>_____<br>_____ |               |                       |                     |
| <b>TYPE NAME:</b>   |               | <b>SIGNATURE:</b>     |                     |
| <b>ACCREDITATION</b>  | <b>STATE:</b> | <b>ACCREDITATION:</b> | <b>DATE ISSUED:</b> |
| <b>AGENCY:</b>  |               |                       |                     |

# 6 THE MANAGEMENT PLAN

## Introduction

Once the accredited inspector has identified the ACBM in the building(s) and has documented this information in the inspection report, an accredited management planner will use the report to identify and address hazards or potential hazards relating to the friable ACBM identified. The information from the inspection report will become part of the management plan. The management plan, which is a site-specific guidance document that the LEA designated person must follow in managing the ACBM present in each school building, must be prepared by an accredited management planner. A management plan must be updated to keep it current with ongoing operations and maintenance, periodic surveillance, inspection, reinspections and response action activities.

Table 6-1 identifies the elements required to be in the management plan under § 763.93 of the AHERA Rule. These requirements are discussed in greater detail in the remainder of this chapter.

Table 6-1

### Contents of the Management Plan

#### General Information

- List of the names and addresses of all school buildings
- Whether the school building contains friable ACBM, nonfriable ACBM, assumed friable ACBM or assumed nonfriable ACBM

#### Designated Person Information

- Name, address, and telephone number of the LEA designated person
- Course name, dates, and hours of training taken by the designated person

#### Inspector Information

- Date of inspection or reinspection
- Name and signature of each accredited person making the inspection or reinspection
- State and accreditation number of each accredited person making the inspection or

## **CHAPTER 6**

### **The Management Plan**

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#### **Information on ACBM Remaining after Response Actions**

- A blueprint, diagram, or written description of any ACBM or suspected ACBM assumed to be ACBM that remains in the school once response actions are undertaken. This should be updated as soon as response actions are completed,

## CHAPTER 6

### The Management Plan

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interim laboratory proficiency program were required to become NIST accredited. Laboratories performing analyses under AHERA must maintain appropriate NVLAP certification. If analyses of either bulk material samples collected during the inspection process or final clearance air samples collected after a response action and analyzed using Transmission Electron Microscopy (TEM) are performed by a laboratory without current NVLAP credentials, the analyses may not be used for AHERA compliance purposes.

Under § 763.87 of the AHERA Rule, a laboratory performing a bulk sample analysis must submit the following documentation for inclusion into the management plan:

- The name and address of each laboratory performing an analysis.
- The date of the analysis.
- The name and signature of the person performing the analysis. The name and signature requirements apply to the microscopist(s) who actually performed each analysis; it is recommended that the laboratory manager also sign the reports.
- Proof that the laboratory has received NVLAP accreditation. This proof should consist of a copy of the laboratory's NVLAP certificate, not just a statement that the laboratory is accredited. For laboratory reports prepared before the NVLAP program was started, proof of the laboratory's EPA interim accreditation is acceptable but should include the laboratory's EPA laboratory accreditation number.

### Response Actions

In the management plan, the accredited management planner must recommend an appropriate response action (operations and maintenance, repair, encapsulation, enclosure, or removal) for all areas of thermal system insulation (TSI) and friable ACBM. The final decision on which action should be taken, however, rests with the LEA. Under AHERA, the response action to be taken must be "sufficient to protect human health and the environment." Once it is determined which response actions meet these criteria, the LEA may choose the action that is the "least burdensome."

AHERA identifies five possible response actions for managing asbestos in schools:

- **Operations and Maintenance (O&M) Program** -- This is a program of work practices designed to maintain friable ACBM in good condition and ensure cleanup of asbestos fibers previously released. An effective O & M program can prevent further release by minimizing and controlling friable ACBM disturbance or damage. (*See Chapter 8 for a complete description of the O&M Program.*)
- **Repair** -- This involves returning damaged ACBM to an undamaged condition or to an intact state by replacing limited sections or patching damaged areas.



*on accreditation).*

### Final Air Clearance After Response Actions

Final clearance of a functional space after a response action to remove, encapsulate, or enclose ACM or material assumed to be ACM involves two steps: visual inspection and the collection and analysis of air samples.

#### Visual Inspection

A visual inspection involves visually examining the asbestos removal area for evidence that the abatement has been successfully completed, including thorough clean-up. Visual inspections are also an important means of determining acceptable completion of small-scale, short-duration O&M or repair operations.

To avoid a potential conflict of interest, it is highly recommended that the visual inspection be performed by an inspector not affiliated with the abatement contractor or anyone else financially associated with the conducting of the asbestos response action.

The inspection should be conducted as rigorously as possible, with all spaces and surfaces where the abatement was conducted being extensively examined for residual ACM debris. The inspection may involve:

- Scrutinizing every corner and crevice of the area within the containment barriers used to isolate the functional space for the response action
- Using a ladder to inspect hard-to-physically-reach areas
- Brushing or wiping surfaces to detect dust
- Using a flashlight beam to detect loose debris or airborne residue
- Using a damp cloth to detect dust
- Inspecting permanent fixtures in the area, such as ceiling tile grid bars, pipes, ducts, etc.
- Inspecting for asbestos-laden water, which may have leaked from the enclosure onto floor surfaces beneath the abatement area

## CHAPTER 6

### The Management Plan

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- Examining surfaces for water and/or debris markings
- Checking crawl spaces on hands and knees; dirt floors may contain pulverized or impacted asbestos debris

The aim of the visual inspection is to ensure that:

- Seals on windows, doors, and vents remain in place during final air monitoring
- Isolation barriers separating the abatement area from non-abatement areas are in place
- No evidence of residue, debris, or dust is present in the abatement area

The presence of any visible residue on surfaces within the abatement area indicates a need for additional cleaning of the surfaces. If an area passes visual inspection but then fails to meet air sampling and analysis requirements after that inspection, the site must be recleaned and an additional visual inspection be conducted to detect any material that may have been uncovered or released during recleaning. Only after visual inspection clearance has been completed may final air sampling be done.

The results of the visual inspection should always be documented and signed by the person conducting the visual inspection.

#### Final Air Sampling and Analysis

Section 763.90 of the AHERA Rule requires that the LEA accomplish final air sampling and analysis of all removal, encapsulation, or enclosure projects by using the transmission electron microscopy (TEM) method, unless the project involves no more than 160 square feet or 260 linear feet of ACBM, in which case phase contrast microscopy (PCM) may be used. Note that no final air clearance is required for small-scale, short-duration O&M projects. (*See Appendix B of the AHERA Rule for information on the types of projects that qualify as small-scale, short-duration.*)

Sampling operations for airborne asbestos following an asbestos abatement action must be performed by qualified individuals completely independent of the abatement contractor to avoid possible conflict of interest. EPA recommends that the LEA obtain professional assistance to perform the sampling and analysis.

- The TEM Method

The TEM Method involves the collection of at 13 samples (five samples inside the functional space; five samples representative of air entering the abatement site; and three quality control "blank" samples). The air samples must be collected using "aggressive" methods or artificially disturbing the air in the functional space before and during sampling, as described in Appendix A, Section III(B)(7)(d) of the AHERA Rule. In most cases, only the 5 samples collected inside the functional space will be analyzed. If the average result of

CHAPTER 6  
The Management Plan

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Table 6-2

| <b>Implementation Requirements for Operations<br/>Associated with the Management Plan</b> |  |
|---|--|
| <b>Requests</b>   | <b>Deadline</b>  |
| <b>The Management Plan</b>  | The plan must be kept current with ongoing O & M, periodic surveillance, inspection, reinspection, and response action activities, including updating the locations of ACBM after response actions and O & M activities.   |
| <b>O&amp;M Program</b>  | Must begin immediately upon the identification of any friable ACBM present or assumed to be present in the building.   |
| <b>O&amp;M Training</b>   | In order to work in a building that may contain asbestos, custodial workers and maintenance staff members must have completed the 2-hour training class described in § 763.92(a)(1) within 60 days of employment. Workers must have completed the 14-hour training requirement described in § 763.92(a)(2) to conduct O&M activities which may disturb ACBM. |
| <b>Periodic Surveillance</b>  | Under § 763.92(b)(1) of the AHERA Rule, periodic surveillance must be conducted at least once every 6 months after a management plan is in effect.   |
| <b>Warning Labels</b>   | Must be posted as soon as possible after identification of ACBM in any routine maintenance area.   |
| (cont.)   |  |

### FREQUENT PROBLEMS WITH MANAGEMENT PLANS

The Asbestos Management Plans (Plan) should be considered "living" document. *Some Plans are left exactly the same as they were when they were created, with no updates whatsoever.* This is particularly true with respect to required records of periodic surveillances, annual notifications, response actions or fiber releases, and for records of the two-hour and sixteen-hour training for school employees and maintenance workers. In fact, the *administrative staff at individual schools are sometimes unaware of the existence of management plans and/or do not know where the school's copy of the plan is kept.*

*Copies of all pertinent certification credentials* for AHERA inspectors, management planners, project designers, workers and supervisors who have participated in any response actions are required to be in the management plan, but *are not always included.* Also *proper documentation of air samplers' and laboratories' accreditations are sometimes missing* from Plans.

*Homogeneous areas are often not clearly (and frequently are not properly) defined* on the basis of color, texture, size. Plaster and sheetrock are probably the most often overlooked materials which are likely to comprise major areas of suspected asbestos-containing building materials (ACBM). *Sampling locations within the individual homogenous areas are often not described precisely* enough to provide for any relocation of individual original sampling sites with any degree of certainty.

Frequently *insufficient numbers of samples are collected from individual homogeneous areas* (the correct minimum number being dependent upon the type of building material and the homogeneous area size), and the sites for the sampling which was done may have been selected in a manner other than as is set forth in the management plan for how sampling locations were to have been determined. Also, where *warning signs* are required, they may be *missing*, or if present, they may not employ the prescribed text.

Sometimes *functional areas are not taken into consideration in the preparation of assessment and response actions recommendations.* Also recommended response actions may not have been carried out according to schedules shown in the management plans and explanations or changes in the schedules may be absent.

*Portable buildings on school grounds are sometimes overlooked* in management plans, or these units may have been moved onto or off of a school's grounds without the school's management plan having been updated.

## CHAPTER 6

### The Management Plan

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**Table 6-4: Management Plan Compliance Checklist**

This checklist is designed to enable you to determine if a management plan contains each and every element required by law. This checklist is for management plans created for inspections completed on or after December 14, 1987. Unless otherwise noted, all statutory references are to the AHERA Rule.

#### GENERAL INFORMATION

- 1. List of the name and address of each school building
- 2. Whether the school building contains friable ACBM, nonfriable ACBM, and friable and nonfriable ACBM assumed to be ACBM

#### DESIGNATED PERSON INFORMATION

- 3. The name, address, and telephone number of the designated person
- 4. The course name, dates, and hours of training taken by the designated person to carry out his or her duties
- 5. Signed statement by the AHERA designated person that the LEA responsibilities under AHERA Rule has been or will be met

#### INSPECTOR INFORMATION

- 6. The date of inspection or reinspection
- 7. The name and signature of each accredited person making the inspection or reinspection
- 8. The State, accreditation number, and name of training provider for each accredited inspector making the inspection or reinspection (copy of certificate is ideal)

#### SAMPLING INFORMATION

- 9. 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
- 10. The exact location where each bulk sample was collected
- 11. The date of collection of each bulk sample
- 12. The homogeneous areas where friable suspected ACBM is assumed to be ACBM
- 13. The homogeneous areas where nonfriable suspected ACBM is assumed to be ACBM
- 14. A description of how sampling locations were determined
- 15. The name and signature of each accredited inspector who collected the samples
- 16. State, accreditation number and name of training provider of each accredited inspector who collected the samples (copy of accreditation certificate is ideal)

Management Plan Compliance Checklist (cont.)

**CHAPTER 6**  
**The Management Plan**

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**Management Plan Compliance Checklist (cont.)**

- 34. A plan for operations and maintenance (O&M) activities under § 763.91
- 35. A plan for periodic surveillance and copies of the reports (see § 763.92)
- 36. A description of the management planner recommendations regarding additional cleaning under § 763.91(c)(2) as part of an O&M program and documentation of cleaning
- 37. A description of steps taken to inform workers and building occupants about inspections, reinspections, response actions, and post-response actions, including periodic surveillance
- 38. An evaluation of the resources needed to complete response actions and carry out reinspection, O&M activities, periodic surveillance and training
- 39. The name of each consultant who contributed to the management plan
- 40. With respect to each consultant who contributed to the management plan, a copy of the accreditation certificate (or name of training provider, State and accreditation number)
- 41. The response of the LEA to any recommendation for additional cleaning

**Checklist of Final Air Clearance Documentation**

This checklist will indicate whether each final clearance was properly documented.

- 1. The name and signature of any person collecting any air sample required to be collected at the completion of a response action
- 2. The locations where those samples were collected
- 3. The name and address of the laboratory, analyzing the samples
- 4. The date(s) of analysis
- 5. The results of analysis
- 6. The method of analysis
- 7. The name and signature of the person performing the analysis
- 8. Evidence that the laboratory is NVLAP accredited

## CHAPTER 7

### Reinspections and Periodic Surveillance

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- Record and submit the following information for inclusion in the management plan to the LEA designated person within 30 days of the reinspection:
  - Date of the reinspection
  - Name and signature of the person conducting the reinspection
  - State, accreditation number, and training provider name for any person conducting the reinspection (copy of certificate is ideal)
  - Exact locations where samples were collected during the reinspection
  - Description of the manner used to determine sampling locations
  - Name and signature of each accredited inspector who collected the samples
  - State, accreditation number, and training provider name for each inspector who collected the samples (copy of certificate is ideal)
  - Any assessments or reassessments made of friable material
  - Name and signature of the accredited inspector making the assessments
  - State, accreditation number and training provider name for each inspector making the assessments (copy of certificate is ideal)

#### Management Planner Responsibilities

Once a reinspection is completed, the management planner must:

- Review the results of the reinspection. This includes reviewing the original inspection report, periodic surveillance records, and the completed reinspection forms and report. The management planner should conduct school visits and gather other information so that he or she can make effective response action recommendations.
- Make written response action and preventive measure recommendations for each area of friable surfacing and miscellaneous ACBM and each area of TSI ACBM. The management planner should determine whether additional cleaning is necessary and, if so, specify how, when, and where to perform cleaning. The management planner should also include an implementation schedule for the recommended activities and make an estimate regarding the resources (cost, personnel, equipment, etc.) needed to conduct the activities.
- Review the adequacy of the Operations & Maintenance Program.
- The recommendations should include a record of the name, signature, State, accreditation number and training provider name for the management planner (copy of certificate is ideal) and the date on which the management planner submitted the recommendations.

For further information on reinspection requirements, review *A Guide to Performing Reinspections Under the Asbestos Hazard Emergency Response Act (AHERA)* (March 1992).

# 8 THE OPERATIONS AND MAINTENANCE PROGRAM

## Introduction

As discussed in Chapter 6, the management planner is responsible for recommending appropriate response actions for managing ACM found in a school building. An operations and maintenance (O&M) program must be implemented whenever any asbestos-containing building materials are found in a the school building. The purpose of the O&M program is to prevent the release of asbestos fibers through careful management of asbestos-containing building materials.

*Managing Asbestos in Place, A Building Owner's Guide to Operations and Maintenance Programs for ACM (the "Green Book") offers important information on how to implement an O&M program effectively.*

## Objectives of the O&M Program

An O&M program consists of a set of procedures and practices for operating and maintaining a building to keep it as free of asbestos contamination as possible. The program should be designed specifically to address the ACM present in the building involved.

An O&M program has three main objectives:

- Clean up existing contamination.
- Minimize future fiber release by controlling access to ACM and instituting proper work practices.
- Properly maintain the ACM until it is removed.

Since National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations (*See Chapter 11 for a discussion of NESHAP*) require that friable and nonfriable ACM which is likely to become friable be removed from buildings before demolition, the O&M program is not a permanent solution. In addition, the asbestos NESHAP may regulate the removal of asbestos as part of a renovation. It is also not a means by which full-scale



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maintenance project.

- Post signs to prevent entry 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, such as wet methods, protective clothing, HEPA vacuums, mini-enclosures, and glove bags, as necessary to inhibit the spread of any released fibers.
- Clean all fixtures or other components in the immediate work area.
- Place the asbestos debris and other cleaning materials in a sealed, leak-tight container.

### Training

Within 60 days of hire, maintenance and custodial staff who may work in a building that contains ACM must receive at least two hours of asbestos awareness training. Those members of the maintenance and custodial staff who conduct any activity that will disturb ACM must receive an additional 14 hours of training. Other state and local training requirements may apply. (See Chapter 9 for further information on training requirements.)

### Emergency Response Procedures

As long as ACM remains in a building, there is a risk of a fiber release episode. Custodial and maintenance workers should be aware of this and should always report any of the following occurrences to the LEA designated person:

- Any debris found on the floor or other horizontal surface
- Any water or physical damage to the ACM
- Any other evidence of possible fiber release

There are two types of fiber release episodes: minor episodes and major episodes. The specific procedures that must be followed depend on which type of episode occurs.

#### Minor Fiber Release Episode

A minor fiber release episode consists of the falling or dislodging of three square or linear feet or less of friable ACM. Section 763.91(f)(1) of the AHERA Rule requires that when such an event occurs, the LEA must ensure that:

- The debris is thoroughly saturated using wet methods
- The area is cleaned
- The asbestos debris is placed in a sealed, leak-tight container

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- Special Work Practices for Renovation/Remodeling

#### Notification

Once ACBM is identified or assumed to be present in a building, the LEA must provide an annual *written* notification to building occupants, employees, and parents on the locations of asbestos-containing building materials in the school buildings, the availability of the asbestos management plan, and recent and upcoming asbestos activities, such as abatement projects, reinspections, etc. Other types of information to include in the notification are: what asbestos is and how it is typically used; the health effects associated with asbestos exposure; the type(s) of ACBM present in the building; the location(s) of these materials; how individuals can avoid disturbing the ACBM; how damage is recognized and to whom it should be reported; how custodial and maintenance personnel are dealing with these materials to prevent fiber release; the asbestos-related training for custodial and maintenance personnel; the steps that will be taken to protect the health and safety of building occupants; and the name and telephone number of the LEA designated person responsible for asbestos-related activities in the building.

Such a notification alerts affected parties to a potential hazard in the building. Building occupants, employees, and others who are aware of the presence of ACBM are less likely to disturb the material and cause fiber release.

Notification of building occupants, employees, parents and others is best accomplished through distributing written notices, which may be tailored to specific parties. A common practice is to publish the notification in the school's newsletter, which is distributed to school employees and parents. The designated person must document the notification process and maintain records of all notifications made.

#### Labeling

Under § 763.95 of the AHERA Rule, the LEA must attach a warning label immediately adjacent to any friable and nonfriable ACBM and suspected ACBM that is located in routine maintenance areas (such as boiler rooms) at each school building. Such material includes friable ACBM that was responded to by a means other than removal (*e.g.*, encapsulation) and ACBM for which no response action was carried out.

The labels must be prominently displayed in readily visible locations, must be in print that is readily visible due to its large size or bright color, and must remain posted until the ACBM that is labeled is removed. The warning label must read:

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

Unlike notification, labeling is not intended as a way to disseminate general information. Instead, it is a last line of defense to prevent unprotected individuals from unknowingly

## CHAPTER 8

### The Operations & Maintenance Program

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ACBM in a school building, they must be notified of the locations of ACBM or suspected ACBM in the building. This notification should be documented. These workers should have documentation of appropriate training, should they disturb ACBM during their work. Note that State licensing requirements vary.

*(See Example Form 5 at the end of this chapter for an example of a maintenance and renovation permit application.)*

#### Special Work Practices for Maintenance Activities

In buildings where ACBM is present, routine maintenance activities, such as work on light fixtures, plumbing fixtures and pipes, air registers, HVAC ducts, and other accessible parts of a building's utility systems, can disturb ACBM and raise levels of airborne asbestos. As a result, maintenance workers should be instructed not to perform any maintenance work that could disturb ACBM unless they are appropriately trained and use specific work practices. These work practices should be tailored to reflect the likelihood that an activity will disturb the ACBM and cause fibers to be released. In determining which work practices should be followed, activities should be placed in one of four categories:

- **Contact with ACBM Unlikely** -- In some buildings with ACBM, many routine maintenance activities can be conducted without contacting the ACBM. Changing a light bulb in a fixture that has asbestos-containing acoustical plaster nearby can usually be performed without jarring the fixture, for example. *(Note that under the AHERA Rule, the top of the fixture should already have been wet-cleaned to remove settled fibers.)* In such situations where contact with ACBM is unlikely, the only precaution other than normal care generally necessary is to ensure that respirators and a HEPA vacuum are available if needed. These do not have to be taken to the site of the project; they should just be available at a known location in the building.

When maintenance is performed in parts of the building that are free of ACBM, no special precautions are usually necessary. An exception would be work in an area containing no ACBM that causes vibrations to be transferred to a location where ACBM is present.

- **Accidental Disturbance of ACBM Possible** -- Where routine maintenance and repair activities are conducted on fixtures or system parts that are located near friable ACBM, maintenance workers may unintentionally disturb the ACBM and release asbestos fibers. Maintenance work on ventilation ducts in an air-handling room where asbestos fireproofing is on the structural beams could accidentally disturb the fireproofing, for example.

For a discussion of the work practices needed where an accidental disturbance of ACBM is possible, see the Green Book.

- **Disturbance of ACBM Intended or Likely** -- Some maintenance and repair activities

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The Operations & Maintenance Program

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Stripping of Vinyl Asbestos Floor Coverings

*Training*

Custodial and maintenance personnel who are responsible for the care and maintenance of asbestos containing floor coverings should be thoroughly trained to safely and properly operate the machines, pads and floor care chemicals used at the facility.

*Frequency of Stripping*

Stripping of vinyl asbestos floor coverings should be done as infrequently as possible (e.g., once per year maximum and preferably when the building is unoccupied). Excessive stripping of floors using aggressive techniques will result in increased levels of asbestos fibers in the air.

*Prior to Stripping*

Prior to machine operation, apply an emulsion of chemical stripper in water to the floor. Use a mop to soften the wax or finish coat.

*Stripping Operations*

When stripping floors becomes necessary, the machine used for stripping the finish should be equipped with the least abrasive pad as possible (black pads are usually the most abrasive and the white pad the least abrasive). Consult with your floor tile and floor finish product manufacturer for recommendations on which pad to use on a particular floor covering. Incorporate the manufacturer's recommendations into your floor maintenance work procedures.

The machine used to remove the wax or finish coat should be run at a low rate of speed (i.e., ranging between 175-300 rpm) during the stripping operation. There is a direct correlation between machine speeds and the release of asbestos fibers from asbestos containing floor coverings. The higher the machine speed the greater the probability of asbestos fiber release.

Never perform dry stripping. Always strip floors while wet. Do not operate a floor machine with an abrasive pad on unwaxed or unfinished floor containing-asbestos materials.

Consult with floor tile and floor finish product manufacturers concerning specific or unique problem(s) on the maintenance of your floors.

*After Stripping*

After stripping and before application of a high solids floor finish, the floor should be thoroughly cleaned, while wet, preferably with a Wet-Vac HEPA filtration vacuum system.

Finishing of Vinyl Asbestos Floor Coverings

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### The Operations & Maintenance Program

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building(s).

#### *Use of Mats*

Where feasible, use mats at entrance ways to cafeterias, gymnasiums, libraries, etc., to protect against possible scuffing of floor covering(s), etc. from salt and ice-melting compounds and from ocean sand.

#### **Special Work Practices for Renovation/Remodeling**

Building renovation or building system replacement can cause major disturbances of ACBM that are beyond the scope of school O&M programs. Moving walls, adding wings, and replacing heating or air conditioning systems are likely to involve breaking, cutting, or otherwise disturbing ACBM that may be present. It is highly recommended that ACBM that may be disturbed be removed before any of these activities are begun. The LEA may be required to remove the ACBM if the amount of ACBM that is likely to be disturbed exceeds the threshold amounts of 160 square feet or 260 linear feet established by the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations. (*See Chapter 11 for further information on the Asbestos NESHAP regulations.*)

Although remodeling projects change the building structure less dramatically than renovation projects, disturbances of ACBM are still possible. When a remodeling project involves direct contact with ACBM (such as painting or wallpapering over ACBM), the O&M procedures described in § 763.91(d) of the AHERA Rule must be followed. If the work to be done will make the material friable, the work must either be limited to small-scale, short-duration or be treated as a response action.

#### **Handling and Disposing of Asbestos Wastes**

The amount and type of asbestos present both determine whether the LEA must notify EPA (or delegated states) and what procedures that the LEA must follow to control asbestos emissions. If the amount exceeds the regulatory threshold, then a written notification must be submitted ten working days prior to any asbestos stripping or removal operation or demolition operation. EPA regulations (along with state and local requirements) provide detailed instructions on the handling, transport, and disposal of asbestos materials. This includes emission control methods (such as wetting and leak proof wrapping), labels on the containers, recordkeeping and a trained representative on-site. Waste must be disposed of at a site meeting federal, state and local requirements. For a site in your area, contact the local public health department.

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**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  
proce  
dures.

Descr  
ibe  
the  
clean  
up:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signed \_\_\_\_\_ Date: \_\_\_\_\_  
(Asbestos Program Manager)

# 9 TRAINING AND ACCREDITATION

## Introduction

AHERA requires that LEAs employ accredited persons to perform most of the activities associated with asbestos management. Building inspectors, management planners, project designers, contractors/supervisors, and asbestos workers must all complete EPA- or State-approved courses that result in accreditation. The specific training requirements for each of these categories of workers are outlined in Appendix C to the AHERA Rule (the AHERA Model Accreditation Plan). The AHERA Rule also details specific training requirements for LEA designated persons and maintenance and custodial workers, although these individuals are not required to complete any EPA-approved courses or receive accreditation.

## Designated Person Training

AHERA requires that the AHERA Designated Person be *adequately* trained to carry out his or her responsibilities. Due to the differing needs of school districts based on the size of the district and the amount and condition of the ACBM, AHERA does not list a specific training course or specific number of hours of training for the DP. Further, AHERA does not require the DP to be accredited. Specifically, the regulations note the training must include the following topics:

- health effects of asbestos;
  - detection, identification and assessment of asbestos-containing building materials;
  - options for controlling asbestos-containing building materials; and
  - asbestos management programs.
- Relevant Federal and State regulations concerning asbestos, including AHERA and its implementing regulations and the regulations of the Occupational Safety and Health Administration, the U.S. Department of Transportation, and the U.S. Environmental Protection Agency (*See Chapter 11 for further information on regulations related to AHERA.*)

The training completed by the designated person must be documented by course name, dates, and hours of training. This documentation must be kept as a permanent part of the management plan.

To determine whether reviewing this document would satisfy the training requirements for the DP, school personnel should consult with the regional asbestos coordinator in the EPA

## CHAPTER 9

### Training and Accreditation

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Under AHERA, LEAs may employ the following individuals only if they have completed EPA- or State-approved training courses, passed the exams, and received accreditation.

**Building Inspectors** -- Building inspectors must complete a minimum of three days (24 hours) of training. Training course information covers technical information needed to identify and describe ACBM and information needed to write an inspection report.

**Management Planners** -- Management planners must complete a two-day (16 hours) course after they have completed and passed the exam for the building inspector training described above. This course is an extension of the building inspector training and teaches how to develop a schedule (or plan) for implementation of response actions for hazards or potential hazards identified in the inspection report, how to develop an O&M plan, and how to prepare and update a management plan.

**Project Designers** -- Project designers must complete a three-day (24 hours) abatement project designer training course. The project designer course teaches how to design response actions and abatement projects. It also covers basic concepts of architectural design, engineering controls and proper work practices as required by the regulation.

**Contractors/Supervisors** -- Contractors/supervisors must complete a minimum of five days (40 hours) of training. The course teaches proper work practices and procedures and covers contractor issues such as legal liability, contract specifications, insurance and bonding, and air monitoring. The course fulfills the OSHA "competent person" training requirement and the NESHAP "trained representative" requirement.

**Asbestos Workers** -- An asbestos worker must complete a minimum of four days (32 hours) of training. The course covers work practices and procedures, personal protective equipment, health effects of asbestos exposure, and other information critical to individuals who work in an abatement area with hazardous materials.

#### Update Training

All project designers, contractors/supervisor, and asbestos workers must complete a one day annual refresher training course for reaccreditation. Building inspectors must complete a half-day refresher course. Management planners must attend the half-day building inspector refresher course as well as a half-day management planner refresher course. Documentation of any annual training should be kept in the management plan.

Although not specifically required by the AHERA Rule, annual refresher/update training for maintenance workers is recommended. OSHA requires annual training.



**CHAPTER 9**  
**Training and Accreditation**

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**Table 9-2**

| <b>Accredited Personnel Training Requirements</b> |   |                                  |                                      |
|---|---|----------------------------------|--------------------------------------|
| <b>Job Title</b>                                  | <b>Subject Matter of Training</b>   | <b>Amount of Training (Days)</b> | <b>Annual Training Update (Days)</b> |
| <b>Building Inspectors</b>                        | Technical information needed to identify and describe ACBM; information needed to write an inspection report  | 3                                | 1/2                                  |
| <b>Management Planners</b>                        | Extension of the building inspector training, plus how to develop a schedule (or plan) for implementation of response actions for hazards or potential hazards identified in the inspection report, how to develop an O&M plan, and how to prepare a management plan. | 2 <sup>a</sup>                   | 1 <sup>b</sup>                       |
| <b>Project Designers</b>                          | How to design response actions and abatement projects; basic concepts of architectural design, engineering controls and proper work practices   | 3                                | 1                                    |
| <b>Contractors/ Supervisors</b>                   | Proper work practices and procedures; contractor issues such as legal liability, contract specifications, insurance, and bonding; air monitoring  | 5                                | 1                                    |
| <b>Asbestos Workers</b>                           | Work practices and procedures, personal protective equipment, health effects of asbestos exposure, and other critical information   | 4                                | 1                                    |

<sup>a</sup> Management planners must first complete the building inspector training and pass the exam.

<sup>b</sup> This includes the one-half day building inspector training update.

# 10 RECORD-KEEPING

## Recordkeeping of Management Plans

Under § 763.93(g) of the AHERA Rule, each LEA is required to keep in its administrative office a copy of the management plans for each school. *(See Table 6-1 for a comprehensive list of the required contents of the management plan.)* The management plan must be available, without cost or restriction, for inspection by the public, including teachers, other school personnel and their representatives, and parents, as well as by representatives of EPA and the State.

In addition, each school is required to maintain in its administrative office a complete and updated copy of the management plan for that school. The school must make the plan available for inspection to those individuals listed above as well as to workers before work begins in any area of a school building.

It is the responsibility of the LEA designated person to ensure that complete and up-to-date records are maintained and included in the management plan. Section 763.94 of the AHERA Rule requires that the LEA maintain the following records *(Note that some of these requirements have been listed in other portions of this guide).*

### Training Information

For each person required to be trained under §§ 763.92(a)(1) and (2) of the AHERA Rule (maintenance and custodial worker training), the LEA must provide:

- The person's name and job title
- The date that training was completed
- The location of the training
- The number of hours completed in the training

### Periodic Surveillance Information

Each time that periodic surveillance is conducted under § 763.92(b) of the AHERA Rule, the LEA must record:

- The name of each person conducting the surveillance
- The date of the surveillance

## CHAPTER 10

### Recordkeeping

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#### Information on Response Actions and Preventive Measures

For each preventive measure and response action taken for friable and nonfriable ACBM and friable and nonfriable suspected ACBM assumed to be ACBM, the LEA must provide:

- A detailed written description of the measure or action, including the method used
- The location where the measure or action was taken
- Reasons for selecting the measure or action
- The start and completion dates of the work
- If applicable, the names and addresses of all contractors involved with the work
- If applicable, the State, accreditation number, and training provider name of all contractors involved with the work (a copy of the certificate)
- If ACBM is removed, the name and location of the ACBM storage or disposal site

#### Air Sampling Information

In addition to the information required to be provided for each preventive measure and response action taken for friable and nonfriable ACBM and friable and nonfriable suspected ACBM assumed to be ACBM (*See above*), when air sampling is performed for final air clearance of response actions, the LEA must provide:

- The name and signature of any person collecting any air sample required to be collected at the completion of a response action
- The locations where samples were collected
- The date(s) of collection
- The name and address of the laboratory analyzing the samples
- The date(s) of analysis
- The results of the analysis
- The method of analysis
- The name and signature of the person performing the analysis
- A statement that the laboratory is NVLAP accredited or EPA approved

# 11 RELATED REGULATIONS

## Introduction

Although AHERA and its implementing regulations, the AHERA Rule, set out many of the responsibilities of the LEA, there are several other federal regulations that the LEA should be aware of when implementing an asbestos management program. These regulations include:

- National Emission Standards for Hazardous Air Pollutants (NESHAP)
- Occupational Safety and Health Administration (OSHA) Construction Industry Standard (29 CFR 1926.1101) and General Industry Standard (29 CFR 1910.1001)
- The EPA Worker Protection Rule (40 CFR § 763.121)
- Department of Transportation (DOT) regulations governing the transport and disposal of asbestos-containing materials (49 CFR Parts 171 and 172)

Each of these regulations is discussed in greater detail below. By following the requirements of these related regulations, the LEA can protect not only the people in its buildings from negative health effects but also may protect itself from legal liability. These regulations should be considered to establish minimum standards; going beyond these requirements may help keep buildings as safe as possible. For further information about these related regulations, call the Asbestos Ombudsman Clearinghouse Hotline at (800) 368-5888 between 8:00 a.m. and 4:30 p.m., Eastern.

### National Emission Standards for Hazardous Air Pollutants

The LEA (school district) must comply with the National Emission Standards for Hazardous Air Pollutants for Asbestos (NESHAP) regulations when removing asbestos materials. These regulations specify control requirements for most asbestos emissions, and include work practices to be followed to minimize the release of asbestos fibers during the handling, removal and disposal of asbestos waste materials. NESHAP regulations are frequently enforced by the State or Local Agencies.

A significant term, which is used through NESHAP, is Regulated Asbestos-Containing

## CHAPTER 11

### Related Regulations

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However, EPA has promulgated Worker Protection Rules to cover these employees (see below). These standards include required work practices, engineering controls, permissible exposure limits, written programs for respiratory protection and medical surveillance, methods for compliance, hazard communication, housekeeping, competent person training and responsibilities, and required recordkeeping. Also included are demolition, removal, alteration, repair, maintenance (such as custodial workers who clean vinyl asbestos tile floors), installation, clean-up of spills, transportation, disposal and storage of asbestos.

OSHA revised its standards on August 10, 1994. Significant changes to the standards included the following:

- PEL decrease to 0.1 f/cc; action level deleted;
- Asbestos Containing Material defined as material containing more than 1% asbestos (now consistent with EPA);
- Building owners are now covered and have specific duties to identify building materials and notify/communicate with others;
- All asbestos work, regardless of exposure levels, requires at least basic controls and work practices, and exposure monitoring;
- Construction work is classified according to friability of the asbestos and hazardousness of the operation. Increasingly friable and hazardous operations require increasingly stringent engineering controls, work practices, protective equipment, training and monitoring; and
- Training requirements changed to correspond to EPA training.

Two programs are of particular importance to the LEA. OSHA requires establishment of a respiratory protection program (29 CFR § 1910.134) that is designed to protect persons, including the designated person and any employees, who do any work with ACM. The program requires that such persons be equipped with a respirator that provides adequate protection against asbestos. Further, the program must include written standard operating procedures governing the selection and use of respirators, selection of respirators based on the hazards to which workers are exposed, an instruction and training program in the proper use of respirators and its limitations, and requirements for the cleaning, disinfecting, inspecting, and storing of respirators. The written program must be on the job site when asbestos work is being conducted. *(See Chapter 8 under the heading "Employee Protection & Medical Surveillance Programs" for a further discussion of this program.)*

*(See the Model Respiratory Protection Program Checklist at the end of this chapter.)*

The second program is the medical surveillance program, which requires that every person

**CHAPTER 11**  
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**Chapter 11 Summary**  
**Key Points About Related Regulations**

An asbestos management program is subject not only to AHERA and the AHERA Rule, but also may be subject to NESHAP, OSHA, and DOT regulations, and the **EPA Worker Protection Rule**.

Relevant provisions of NESHAP establish **work practices for asbestos air emission control** when a facility is being demolished or renovated, and for the disposal of **asbestos-containing waste material**.

The OSHA established **minimum standards for the protection of workers involved in asbestos-related work or employees exposed to asbestos-contaminated workplaces**. These standards include required work practices, engineering controls, permissible exposure limits, written programs for respiratory protection and medical surveillance, methods for compliance, hazard communication, housekeeping, competent person training and responsibilities, and required recordkeeping. OSHA excludes federal, state, or local government employees from its worker protection rules (including public school employees).

The EPA Worker Protection Rule **extends the protection afforded by OSHA** to all employees in asbestos abatement who may have been excluded from protection by OSHA.

Relevant provisions of DOT regulations establish **labeling, packaging and shipping standards** for the transporting of asbestos-containing materials.

**CHAPTER 11**  
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**Model Respiratory Protection Program Checklist (cont.)**

- 10. Surveillance of work area conditions and degree of employee exposure (e.g., through air monitoring)
- 11. Regular inspection and evaluation of the continued effectiveness of the program
- 12. Recognition and resolution of special problems as they affect respirator use (e.g., facial hair, eye glasses, etc.)
- 13. Proper respirator use (e.g., procedures for putting on and taking off respirators when entering and exiting the abatement area)

# Glossary

***Air erosion:*** the passage of air over friable ACBM which may result in the release of asbestos fibers.

***Asbestos:*** the asbestiform varieties of Chrysotile (serpentine); crocidolite (riebeckite); amosite (cummingtonite/grunerite); anthophyllite; tremolite; and actinolite.

***Asbestos-containing material (ACM):*** any material or product which contains more than 1 percent asbestos.

***Asbestos-containing building material (ACBM):*** 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:*** 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:*** 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:*** 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:*** 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, water-stained, 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:*** 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:*** an airtight, impermeable, permanent barrier around ACBM to prevent the release of



(3) The governing authority of any school operated under the defense dependents' education system provided for under the Defense Dependents' Education Act of 1978 (20 U.S.C. 921, et seq.).

**Major fiber release episode:** 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.

**Management Plan:** a site-specific guidance document that the LEA designated person must follow in managing the ACBM present in a school building.

**Minor fiber release episode:** 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.

**Miscellaneous ACM:** other, mostly nonfriable ACM, products and materials (found on structural components, structural members or fixtures) such as floor tile, ceiling tile, construction mastic for floor and ceiling materials, sheet flooring, fire doors, asbestos cement pipe and board, wallboard, acoustical wall tile, and vibration damping cloth.  
miscellaneous material that is ACM in a school building.

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

**Nonfriable:** material in a school building which when dry may not be crumbled, pulverized, or reduced to powder by hand pressure.

**Operations and maintenance program:** 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:** circumstances in which:

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

**Potential significant damage:** circumstances in which:

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

**Preventive measures:** actions taken to reduce disturbance of ACBM or otherwise eliminate the

SSSD can be further defined by the following considerations:

- (1) Removal of small quantities of 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 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.

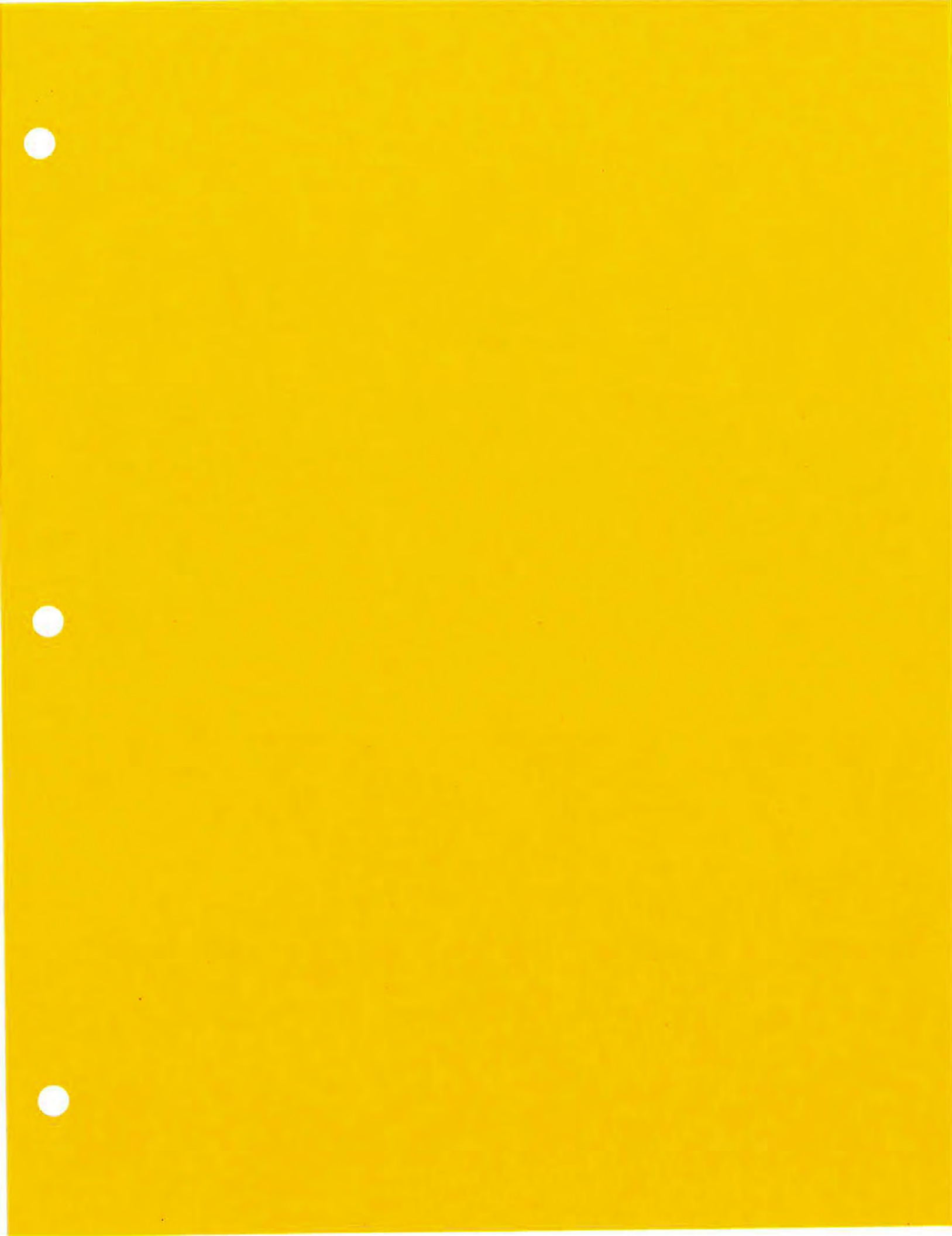
**Surfacing ACM:** interior ACM that has been sprayed on, troweled on, or otherwise applied to surfaces (structural members, walls, ceilings, etc.) for acoustical, decorative, fireproofing, or other purposes. surfacing material that is ACM.

**Surfacing material:** 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:** 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:** insulation used to control heat transfer or prevent condensation on pipes and pipe fittings, boilers, breeching, tanks, ducts, and other parts of hot and cold water systems; heating, ventilation, and air-conditioning (HVAC) systems; or other mechanical systems that is ACM.





**Vibration:** the periodic motion of friable ACBM which may result in the release of asbestos fibers.





# AHERA Asbestos Management Plan Self-Audit Checklist for Designated Persons

Ready, Set, Go!

-  Inspections & Reinspections
-  Response Actions
-  Operations & Maintenance
-  Other AHERA Activities



# **AHERA Asbestos Management Plan Self-Audit Checklist for Designated Persons**

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## Introduction

Under the Asbestos Hazard Emergency Response Act (AHERA) of 1986, EPA published on October 30, 1987 the Asbestos-Containing Materials in Schools rule (hereinafter referred to as the AHERA rule), 40 CFR Part 763, Subpart E. The AHERA rule became effective on December 14, 1987 and applies to all non-profit elementary and secondary schools nationwide, both public and private. Local Education Agencies (LEAs) are responsible for ensuring compliance with the AHERA rule and are required, among other things, to develop and maintain an up-to-date Asbestos Management Plan (AMP), conduct training, inspections and sampling related to asbestos, manage asbestos properly and provide yearly notification to parents, teachers and employee organizations about the AMP and any asbestos-related activities.

LEAs are also responsible for designating a contact person known as the Designated Person (DP) to oversee asbestos-related activities in the school and ensure that the AHERA responsibilities of the LEA are met. The quality of a school's asbestos program depends heavily upon the dedication and work of the DP with the support of the LEA. The LEA and the DP work together to ensure that each school is in compliance with federal, state and local asbestos regulations and that there are no uncontrolled releases of asbestos fibers in the school which could pose a health threat to children and school workers.

Even though the AHERA rule has been in place for years, EPA and the states have found that compliance issues remain, particularly in the area of schools maintaining and updating their AMPs to reflect current reinspection information, operation and maintenance activities, periodic surveillance and response/post-response actions. An up-to-date compliant AMP is key to the success of a school's asbestos program and the protection of children's and school workers' health. In order to enhance compliance, EPA Region 2 has developed this "**AHERA Asbestos Management Plan Self-Audit Checklist for Designated Persons**" and a companion guidance document, a "Model AHERA Asbestos Management Plan for Local Education Agencies." It is recommended that the Checklist be reviewed first in order to quickly identify any potential deficiencies in the schools's AMP.

This AHERA Asbestos Management Plan Self Audit Checklist for Designated Persons is designed to help the DP determine whether or not the school has an up-to-date compliant AMP. The Checklist is divided into six sections: General Information, Inspections and Reinspections, Response Actions, Operations and Maintenance, Periodic Surveillance and Notification. Each section of the Checklist contains questions to guide the DP through a detailed compliance assessment of the school's AMP with check boxes for Yes, No or Not Applicable. Supporting regulatory citations are provided on the Checklist along with spaces for the DP to make notes. Following the Checklist is a Glossary and a list of Acronyms.

The companion guidance document, a Model AHERA Asbestos Management Plan for Local Education Agencies, provides step-by-step instructions for developing an AMP utilizing a suggested standardized format. This document contains suggested forms for including in the school's AMP and tracks the format of the Checklist: General Information, Inspections and Reinspections, Response Actions, Operations and Maintenance, Periodic Surveillance and Notification. Following the forms is a Glossary and a list of Acronyms. For convenience, tips are included in the Checklist which note the corresponding suggested forms that should be completed in the Model AHERA AMP.

Please note that the EPA Region 2 Model AMP forms and Checklist are not a substitute for the applicable legal requirements, are not regulations themselves, and are not required to be used/completed under AHERA. Rather, they are provided by EPA as guidance to enhance schools' compliance with EPA AHERA regulations regarding the required documentation that must be included in the AMP. These documents do not impose legally binding requirements on any party, including EPA, states, or the regulated community, and are not intended and cannot be relied upon to create any rights, substantive or procedural, enforceable by any party in litigation with the United States. Please contact your state asbestos coordinator for information on any applicable state regulations/AMP forms.

If you have any questions on these guidance documents, please call Deborah Craig, EPA Region 2 Asbestos Outreach Coordinator, at (212) 637-3521 or e-mail her at [craig.deborah@epa.gov](mailto:craig.deborah@epa.gov). These guidance documents are available on the EPA website at [http://www.epa.gov/asbestos/pubs/asbestos\\_in\\_schools.html](http://www.epa.gov/asbestos/pubs/asbestos_in_schools.html). For additional asbestos information, please contact the EPA Region 2 Asbestos Coordinator Gaetano LaVigna by phone at (212) 637-4069 or by e-mail at [lavigna.gaetano@epa.gov](mailto:lavigna.gaetano@epa.gov). The EPA Region 2 Caribbean Asbestos Contact is Carlos M. Rivera and he can be reached by phone at (787) 977-5846 or by e-mail at [rivera.carlos@epa.gov](mailto:rivera.carlos@epa.gov).

For any additional asbestos information, please contact your state/EPA asbestos coordinator or call EPA's Toxic Substances Control Act (TSCA) Hotline at (202) 554-1404 or the EPA Asbestos Ombudsman at (800) 368-5888, or visit EPA's website at [http://www.epa.gov/asbestos/pubs/asbestos\\_in\\_schools.html](http://www.epa.gov/asbestos/pubs/asbestos_in_schools.html). A list of state/EPA asbestos coordinators is provided on the EPA website.



**AHERA Asbestos Management Plan  
Self-Audit Checklist for Designated Persons\***

|   |                          |                          |  |
|---|--------------------------|--------------------------|--|
| <b>School:</b>  |                          | <b>Phone:</b>            |  |
| <b>Address:</b>                                       |                          |                          |  |
| <b>County:</b>  |                          |                          |  |
| <b>Local Education Agency:</b>                        |                          | <b>Phone:</b>            |  |
| <b>Address:</b>                                       |                          |                          |  |
| <b>Designated Person:</b>                             |                          | <b>Phone:</b>            |  |
| <b>Address:</b>                                       |                          |                          |  |
| <b>Date Checklist Completed by Designated Person:</b> |                          |                          |  |
| <b>Designated Person's Signature:</b>                 |                          |                          |  |
| <b>Yes</b>  | <b>No</b>                | <b>N/A</b>               | <b>School:</b>   |
| <small>N/A - Not Applicable</small>                   |                          |                          |  |
| <b>General Information</b>                            |                          |                          |  |
| <input type="checkbox"/>                              | <input type="checkbox"/> | <input type="checkbox"/> | 1. Has an Asbestos Management Plan been developed for your school?<br><br><div style="text-align:right;"><small>(40 CFR § 763.93)</small></div>  |
| <input type="checkbox"/>                              | <input type="checkbox"/> | <input type="checkbox"/> | 2. Does the Local Education Agency (LEA) have a complete and up-to-date copy of the school's management plan in both the LEA's administrative office and the school's administrative office?<br><br><div style="text-align:right;"><small>(40 CFR § 763.93(g)(2)-(3))</small></div>  |
| <input type="checkbox"/>                              | <input type="checkbox"/> | <input type="checkbox"/> | 3. Was the management plan developed by an accredited management planner?<br><br><b>Did you know?</b> Your LEA <i>may</i> require each management plan to contain a statement signed by an accredited management plan developer that he/she has prepared or assisted in the preparation of the plan or has reviewed the plan and that the plan is in compliance with 40 CFR 763, Subpart E. The management plan developer that signs the statement may not also implement the plan (40 CFR § 763.93(f)).<br><br><div style="text-align:right;"><small>(40 CFR § 763.93(c))</small></div> |

\* References to Model Asbestos Management Plan (AMP) forms are to the forms contained in EPA Region 2's guidance manual entitled: "Model AHERA Asbestos Management Plan for Local Education Agencies." The Model AMP forms and this Self-Audit Checklist are not a substitute for the applicable legal requirements, are not regulations themselves, and are not required to be used/completed under AHERA. Rather, they are provided by EPA Region 2 as guidance to enhance schools' compliance with EPA AHERA regulations regarding the required documentation that must be included in the AMP. These documents do not impose legally binding requirements on any party, including EPA, states, or the regulated community, and are not intended and cannot be relied upon to create any rights, substantive or procedural, enforceable by any party in litigation with the United States. Please contact your state asbestos coordinator for any applicable state regulations/AMP Forms.

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| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>4. For each consultant who contributed to the management plan, does the plan include the following:</p> <ul style="list-style-type: none"> <li>• consultant's name?</li> <li>• a statement that he/she is accredited under the state accreditation program or another state's accreditation program or an EPA-approved course?</li> </ul> <p style="text-align: right;">(40 CFR § 763.93 (e)(12)(i)-(ii))</p> <p>Note: Although not required, EPA suggests including in the AMP the name of the training agency, the course name and date, and a copy of the accreditation certificate for each consultant.</p> <p>*Tip: See suggested Model AMP Form 1 - Contact Information</p>  |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>5. Does the management plan include a list of the name and address of each building used as a school building and identify whether the school building has:</p> <ul style="list-style-type: none"> <li>• friable ACBM (asbestos-containing building material)?</li> <li>• non-friable ACBM?</li> <li>• friable and non-friable suspected ACBM assumed to be ACM (asbestos-containing material)?</li> </ul> <p style="text-align: right;">(40 CFR §§ 763.93(a)(1)-(2) and 763.93(e)(1))</p> <p>*Tip: See Model AMP Form 2 - School Building List</p>  |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>6. If a new school building was constructed after October 12, 1988 and is asbestos-free, does the management plan include the following and has a copy of same been provided by the LEA to the EPA Regional Office:</p> <ul style="list-style-type: none"> <li>• a statement signed by an architect or project engineer responsible for the construction of the building, or by an accredited inspector, indicating 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?</li> </ul> <p style="text-align: right;">(40 CFR § 763.99(a)(7))</p> <p>*Tip: See Model AMP Form 2 - School Building List</p> |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>7. Does the management plan include a copy of any of the statements required under 40 CFR § 763.99(a)(1)-(7) to support an exclusion from inspection that the school may qualify for under 40 CFR § 763.99 and has a copy of any such statement been provided by the LEA to the Regional Office?</p> <p style="text-align: right;">(40 CFR § 763.99)</p> <p>Note: The exclusion under 40 CFR § 763.99(a)(7) is also covered under Checklist question number 6.</p>   |

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| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>8. Does the management plan include the following information about the LEA Designated Person (DP):</p> <ul style="list-style-type: none"> <li>• Name, address, and telephone number of the DP?</li> <li>• Course name, dates, and hours of training that the DP attended to carry out his or her AHERA duties?</li> <li>• Signed statement by the DP that the LEA's general responsibilities under 40 CFR § 763.84 have been or will be met?</li> </ul> <p style="text-align: right;">(40 CFR § 763.93(e)(4) and (f))</p> <p>Note: Although not required, EPA suggests including in the AMP the name of the training agency and a copy of the DP's training certificates.</p> <p>*Tip: See Model AMP Form 1 - Contact Information and Form 3 - Designated Person Assurances</p>  |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>9. Does the management plan include the following recommendations:</p> <ul style="list-style-type: none"> <li>• A plan for reinspection required under 40 CFR § 763.85?</li> <li>• A plan for operations and maintenance activities (including initial cleaning) required under 40 CFR § 763.91?</li> <li>• A plan for periodic surveillance required under 40 CFR § 763.92?</li> <li>• A description of the management planner's recommendation for additional cleaning under 40 CFR § 763.91(c)(2), as part of an operations and maintenance program, and the response of the LEA to that recommendation?</li> </ul> <p style="text-align: right;">(40 CFR § 763.93(e)(9))</p> <p>*Tip: See Model AMP Form 10 - Plan for Reinspection, Form 14 - Plan for Operations and Maintenance Activities, Form 18 - Periodic Surveillance Plan/Report, and Form 16 Cleaning Record</p>   |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>10. Does the management plan include an evaluation of resources needed to carry out response actions, reinspections, operations and maintenance, and periodic surveillance and training?</p> <p style="text-align: right;">(40 CFR § 763.93(e)(11))</p> <p>*Tip: See suggested Model AMP Form 4 - Evaluation of Resources</p>   |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>11. Does the management plan include a record of the minimum 2 hours of awareness training required under 40 CFR § 763.92(a)(1) for all maintenance and custodial staff who may work in a building that contains ACBM, whether or not they are required to work with ACBM, and does the record include the following information:</p> <ul style="list-style-type: none"> <li>• person's name and job title?</li> <li>• date training was completed?</li> <li>• location of training?</li> <li>• number of hours completed?</li> </ul> <p style="text-align: right;">(40 CFR §§ 763.93(h) and 763.94(c))</p> <p><b>Did you know?</b> New custodial and maintenance employees must be trained within 60 days after starting work (40 CFR §763.92(a)(1)).</p> <p>Note: Although not required, EPA suggests including in the AMP the name of the training agency, the course name, and a copy of the accreditation certificate for each staff person.</p> <p>*Tip: See Model AMP Form 5 - Training Record for Maintenance and Custodial Staff</p> |

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| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>12. Does the management plan include a record of the additional 14 hours of training required under 40 CFR § 763.92(a)(2) for maintenance and custodial staff who conduct any activities that will result in the disturbance of ACM and does the record include the following information:</p> <ul style="list-style-type: none"> <li>• person's name and job title?</li> <li>• date training was completed?</li> <li>• location of training?</li> <li>• number of hours completed?</li> </ul> <p style="text-align: right;">(40 CFR §§ 763.93(h) and 763.94(e))</p> <p>Note: Although not required, EPA suggests including in the AMP the name of the training agency, the course name, and a copy of the accreditation certificate for each staff person.</p> <p>*Tip: See Model AMP Form 5 - Training Record for Maintenance and Custodial Staff</p> |
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**Inspections and Reinspections**

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| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>13. For inspections conducted before 12/14/87 (i.e., the effective date of the 10/30/87 EPA Asbestos-Containing Materials in Schools rule), does the management plan include the following information:</p> <ul style="list-style-type: none"> <li>• date of inspection?</li> <li>• blueprint, diagram or written description of each school building that identifies clearly each location and approximate square or linear footage of homogenous /sampling area sampled for ACM?</li> <li>• if possible, the exact locations where the bulk samples were collected and the dates of collection?</li> <li>• a copy of the analyses of any bulk samples, dates of analyses, and a copy of any other laboratory reports pertaining to the analyses.</li> <li>• description of response actions or preventive measures taken, including, if possible, the names and addresses of all contractors, start and completion dates and air clearance sample results?</li> <li>• description of assessments of material identified prior to 12/14/87 as friable ACM or friable suspected ACM assumed to be ACM, and the name, signature, state of accreditation and if, applicable, the accreditation number of the person making the assessments (i.e., inspector)?</li> </ul> <p style="text-align: right;">(40 CFR § 763.93(e)(2)(i)-(v))</p> <p>*Tip: See Model AMP Form 6 - Inspection Cover Sheet, Form 8 - Homogeneous Area/Bulk Sample Summary, Form 9 - Homogeneous Area/Bulk Sample Diagram, Form 12 - Implementation of Response Actions, and Form 7 - Room/Functional Space Assessment</p> |
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| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>14. Does the management plan include for each inspection and reinspection conducted under 40 CFR § 763.85 the following information:</p> <ul style="list-style-type: none"> <li>• date of the inspection or reinspection?</li> <li>• name, signature, state of accreditation, and, if applicable, the accreditation number for each accredited inspector performing the inspection or reinspection?</li> </ul> <p style="text-align: right;">(40 CFR § 763.93(e)(3)(i))</p> <p>Note: Although not required, EPA suggests including in the AMP the name of the training agency, the course name and date, and a copy of the accreditation certificate for each inspector.</p> <p>*Tip: See Model AMP Form 6 - Inspection Cover Sheet</p> |
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| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>15. Does the management plan include for each inspection and reinspection conducted under 40 CFR § 763.85 the following sampling information:</p> <ul style="list-style-type: none"> <li>• 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?</li> <li>• Exact location where each bulk sample was collected and the date of collection of each bulk sample?</li> <li>• Homogeneous areas where friable suspected ACBM is assumed to be ACM?</li> <li>• Homogeneous areas where nonfriable suspected ACBM is assumed to be ACM?</li> <li>• Description of the manner used to determine sampling locations?</li> <li>• The name, signature, state of accreditation, and, if applicable, the accreditation number for each accredited inspector that collected samples?</li> </ul> <p style="text-align: right;">(40 CFR § 763.93(e)(3)(ii)-(iii))</p> <p>Note: For details on how to collect bulk samples, see 40 CFR § 763.86. Although not required, EPA suggests including in the AMP the name of the training agency, the course name and date, and a copy of the accreditation certificate for each inspector that collected the samples.</p> <p>*Tip: See Model AMP Form 6 - Inspection Cover Sheet, Form 8 - Homogeneous Area/Bulk Sample Summary, and Form 9 - Homogeneous Area/Bulk Sample Diagram</p> |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>16. Does the management plan include for each inspection and reinspection conducted under 40 CFR § 763.85 the following information on the analysis of the bulk samples and has it been submitted to the DP for inclusion in the plan within 30 days of the analysis:</p> <ul style="list-style-type: none"> <li>• Copy of the analysis of any bulk samples collected and analyzed?</li> <li>• Name and address of any laboratory that analyzed bulk samples?</li> <li>• A statement that any laboratory used meets the applicable laboratory accreditation requirements of 40 CFR § 763.87(a)?</li> <li>• Dates of any analyses performed?</li> <li>• Name and signature of the person performing each analysis?</li> </ul> <p style="text-align: right;">(40 CFR §§ 763.87(d) and 763.93(e)(3)(iv))</p> <p>Note: For details on how to submit bulk samples for analysis, see 40 CFR § 763.87.</p>  |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>17. Does the management plan include for each inspection and reinspection conducted under 40 CFR § 763.85 the following assessment information and has it been submitted to the DP for inclusion in the plan within 30 days of the assessment:</p> <ul style="list-style-type: none"> <li>• Written assessments (signed and dated) required to be made under 40 CFR § 763.88 of all ACBM and suspected ACBM assumed to be ACM?</li> <li>• Name, signature, state of accreditation, and, if applicable, the accreditation number of each accredited person making the assessment (i.e., inspector(s))</li> </ul> <p style="text-align: right;">(40 CFR §§ 763.88(a)(2) and 763.93(e)(3)(v))</p> <p>Note: Although not required, EPA suggests including in the AMP the name of the training agency, the course name and date, and a copy of the accreditation certificate for each inspector making the assessment.</p> <p>*Tip: See Model AMP Form 6 - Inspection Cover Sheet and Form 7 - Room/Functional Space Assessment</p>   |

18. Has the following information about the inspection been recorded and submitted to the DP for inclusion in the management plan within 30 days of the inspection:

- Inspection report with the date of inspection signed by each accredited inspector making the inspection, the state of accreditation, and if applicable, his/her accreditation number?
- 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?
- 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?
- List of whether the homogeneous areas identified under 40 CFR § 763.85(a)(4)(vi)(B) of this section, are surfacing material, thermal system insulation, or miscellaneous material?
- Assessments of friable material (signed and dated), the name and signature of each accredited inspector making the assessment, state of accreditation, and if applicable, his or her accreditation number?

(40 CFR §§ 763.85(a)(4)(vi)(A)-(E) and 763.88(a)(2))

Note: For further details on activities conducted during an inspection (e.g., visually inspect/touch material), see 40 CFR § 763.85(a)(4)(i)-(v)

\*Tip: See Model AMP Form 6 - Inspection Cover Sheet, Form 7 - Room/Functional Space Assessment, Form 8 - Homogeneous Area/Bulk Sample Summary and Form 9 - Homogeneous Area /Bulk Sample Diagram

19. Has the following information about the reinspection been recorded and submitted to the DP for inclusion in the management plan within 30 days of the reinspection:

- Date of reinspection, 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?
- Exact location 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 of friable material, date of the assessment or reassessment, the name and the signature of the accredited inspector making the assessments, state of accreditation, and if applicable, his or her accreditation number?

(40 CFR §§ 763.85(b)(3)(vii)(A) - (C) and 763.88(a)(2))

Note: At least once every 3 years after a management plan has been in effect, a reinspection must be conducted by an accredited inspector of all friable and nonfriable known or assumed ACBM in each school building that the LEA leases, owns, or otherwise uses as a school building (40 CFR § 763.85(b)(1)-(2)). For further details on activities conducted during a reinspection (e.g., visually reinspect/touch material), see 40 CFR § 763.85(b)(3)(i)-(vi).

\*Tip: See Model AMP Form 6 - Inspection Cover Sheet, Form 7 - Room/Functional Space Assessment, Form 8 - Homogeneous Area/Bulk Sample Summary, Form 9 - Homogeneous Area /Bulk Sample Diagram

## Response Actions

|  |   |
|--|---|
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>20. Does the management plan include the recommendations made to the LEA regarding response actions under 40 CFR § 763.88(d) and the following information about the accredited management planner:</p> <ul style="list-style-type: none"> <li>• name, signature, state of accreditation, and, if applicable, the accreditation number for each accredited management planner making the recommendations?</li> </ul> <p style="text-align: right;">(40 CFR §§ 763.88(d) and 763.93(e)(5))</p> <p>Note: Although not required, EPA suggests including in the AMP the name of the training agency, the course name and date, and a copy of the accreditation certificate for each accredited person making the recommendations.</p> <p>*Tip: See Model AMP Form 11 - Recommended Response Actions</p>  |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>21. Does the management plan include a detailed description of preventive measures and response actions to be taken, including the following:</p> <ul style="list-style-type: none"> <li>• Methods to be used for any friable ACBM?</li> <li>• Locations where such measures and actions will be taken?</li> <li>• Reasons for selecting the response action or preventive measure?</li> <li>• Schedule for beginning and completing each preventive measure or response action?</li> </ul> <p style="text-align: right;">(40 CFR § 763.93(e)(6))</p> <p>Note: For further details on how to conduct response actions, see 40 CFR § 763.90</p> <p>*Tip: See Model AMP Form 11 - Recommended Response Actions</p> <p><i>Did you know? The LEA may select, from the response actions which protect human health and the environment, the least burdensome action (40 CFR § 763.90(a)).</i></p> |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>22. Does the management plan include one of the following statements for 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:</p> <ul style="list-style-type: none"> <li>• statement that he/she is accredited under the state accreditation program, or that the LEA has used (or will use) persons accredited under another state's accreditation program or an EPA-approved course?</li> </ul> <p style="text-align: right;">(40 CFR § 763.93(e)(7))</p> <p>*Tip: See note on Model AMP Form 3 - Designated Persons Assurances</p>  |

|  |   |
|--|---|
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>23. Does the management plan include a detailed written description of each preventive measure and response action taken for friable and nonfriable ACM and friable and nonfriable suspected ACM assumed to be ACM, including the following:</p> <ul style="list-style-type: none"> <li>• Methods used?</li> <li>• Location where the measure or action was taken?</li> <li>• Reasons for selecting the measure or action?</li> <li>• Start and completion dates of the work?</li> <li>• Names and addresses of all contractors involved and, if applicable, their state of accreditation and accreditation numbers?</li> <li>• If ACM is removed, the name and location of storage or disposal site of the ACM?</li> </ul> <p style="text-align: right;">(40 CFR § 763.94(b)(1))</p> <p>Note: Although not required, EPA suggests including in the AMP a copy of the accreditation.</p> <p>*Tip: See Model AMP Form 12 - Implementation of Response Actions</p> |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>24. Does the management plan include the following sampling information required to be collected at the completion of certain response actions specified by 40 CFR § 763.90(i):</p> <ul style="list-style-type: none"> <li>• Name and signature of any person collecting any air sample required to be collected?</li> <li>• Locations where samples were collected?</li> <li>• Date of collection?</li> <li>• Name and address of the laboratory analyzing the samples?</li> <li>• Date of analysis?</li> <li>• Results of analysis?</li> <li>• Method of analysis?</li> <li>• Name and signature of the person performing the analysis?</li> <li>• Statement that the laboratory meets the applicable laboratory accreditation requirements of 40 CFR § 763.90(i)(2)(ii)?</li> </ul> <p style="text-align: right;">(40 CFR § 763.94(b)(2))</p> <p>*Tip: See Model AMP Form 12 - Implementation of Response Actions</p>   |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>25. Does the management plan include a detailed description in the form of a blueprint, diagram, or written description, of any ACM or suspected ACM assumed to be ACM that remains in the school once response actions are undertaken under 40 CFR § 763.90 and is the description updated as response actions are completed?</p> <p style="text-align: right;">(40 CFR § 763.93(e)(8))</p>   |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>26. For each homogeneous area where all ACM has been removed, have records been retained in the management plan for at least 3 years after the next reinspection required under 40 CFR § 763.85(b)(1), or for an equivalent period?</p> <p style="text-align: right;">(40 CFR §§ 763.93(h) and 763.94(a))</p> <p><i>Did you know? Significantly damaged friable surfacing ACM or significantly damaged friable miscellaneous ACM must be immediately isolated and access must be restricted unless isolation is not necessary to protect human health and the environment. Then, this material must be removed, or depending upon whether enclosure or encapsulation would be sufficient to protect human health and the environment, enclosed or encapsulated (40 CFR § 763.90(d)(1) - (2)).</i></p>  |



## Operations and Maintenance

|  |   |
|--|---|
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>27. Does the management plan include a record of each cleaning conducted under 40 CFR § 763.91(c), including the following:</p> <ul style="list-style-type: none"> <li>• Name of each person performing the cleaning?</li> <li>• Date of the cleaning?</li> <li>• Locations cleaned?</li> <li>• Methods used to perform the cleaning?</li> </ul> <p style="text-align: right;">(40 CFR §§ 763.93(h) and 763.94(e))</p> <p>Note: For details on initial cleaning after an inspection and before the initiation of any response action, other than O&amp;M activities or repair, see 40 CFR § 763.91(c)(1) and for details on any additional cleaning recommended by the management planner and approved by the LEA, see 40 CFR § 763.91(c)(2).</p> <p>*Tip: See Model AMP Form 16 - Cleaning Record</p>   |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>28. Does the management plan include a record of each O&amp;M activity and major asbestos activity, with the following information:</p> <ul style="list-style-type: none"> <li>• Name of each person performing the activity?</li> <li>• For a major asbestos activity, the name, signature, state of accreditation and, if applicable, the accreditation number of each person performing the activity?</li> <li>• Start and completion date of each activity?</li> <li>• Location of the activity?</li> <li>• Description of the activity including preventative measures used?</li> <li>• If ACM is removed, the name and location of the storage and disposal site for the ACM?</li> </ul> <p style="text-align: right;">(40 CFR §§ 763.93(h) and 763.94(f) and(g))</p> <p>Note: The response actions for any maintenance activities disturbing friable ACM, other than small-scale, short-duration maintenance activities, must be designed by persons accredited to design response actions and conducted by persons accredited to conduct response actions (40 CFR § 763.91(e)). Although not required, EPA suggests including in the AMP a copy of the accreditation.</p> <p>*Tip: See Model AMP Form 15 - Operations and Maintenance Activities</p> |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <p>29. Does the management plan include a record of each fiber release episode, whether major or minor, with the following information:</p> <ul style="list-style-type: none"> <li>• Date and location of the episode?</li> <li>• Method of repair?</li> <li>• Preventive measure or response action taken?</li> <li>• Name of each person performing the work?</li> <li>• If ACM is removed, the name and location of the storage and disposal site of the ACM?</li> </ul> <p style="text-align: right;">(40 CFR §§ 763.93(h) and 763.94(h))</p> <p>Note: A major fiber release episode is the falling or dislodging of more than 3 square or linear feet of friable ACM (40 CFR § 763.91(f)(2)). A minor fiber release episode is the falling or dislodging of 3 square or linear feet or less of friable ACM (40 CFR § 763.91(f)(1)).</p> <p>*Tip: See Model AMP Form 17 - Major/Minor Fiber Release Episode Log</p>   |

### Periodic Surveillance

30. Does the management plan include a record of each periodic surveillance performed under 40 CFR § 763.92(b), with the following information:

- Name of person performing the surveillance?
- Date of the surveillance?
- Any changes in the condition of the material?

(40 CFR §§ 763.92(b)(2)(ii)-(iii), 763.93(h) and 763.94(d))

Note: A periodic surveillance of each school building must be conducted at least once every 6 months after a management plan has been in effect (40 CFR § 763.92(b)).

\*Tip: See Model AMP Form 18 - Periodic Surveillance Plan/Report

### Notification

31. Does the management plan include the following notification information:

- Description of the steps taken to notify, in writing, at least once a year, parent, teacher and employee organizations of the availability of the management plan for review?
- Dated copies of all such management plan availability notifications (e.g., letter, newsletter)?
- Description of the 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? (Under 40 CFR § 763.84(c), the LEA must inform them about these activities at least once each school year.)

(40 CFR §§ 763.93(e)(10) and 763.93(g)(4))

\*Tip: See Model AMP Form 19 - Plan to Inform

## Appendix A - Glossary

Unless otherwise noted with an asterisk (\*), the following definitions contained in this Glossary can be found under 40 CFR § 763.83:

*Act* means the Toxic Substances Control Act (TSCA), 15 U.S.C. 2601, et seq.

*Accessible* when referring to asbestos-containing material 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 asbestos-containing building material (ACBM) which may result in the release of asbestos fibers.

*Asbestos* means the asbestiform varieties of: Chrysotile (serpentine); crocidolite (riebeckite); amosite (cummingtonitegrunerite); 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, water-stained, 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.

*Designated Person* means a person appointed by the Local Education Agency (LEA), under 40 CFR § 763.84 (g), who is trained to ensure the proper implementation of AHERA in school buildings. \*

*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 (LEA)* 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.

*Phase contrast microscopy (PCM)* refers to the procedure outlined in NIOSH Method 7400 for the evaluation of fibers in air samples.\*

*Polarized light microscopy (PLM)* refers to the method outlined in 40 CFR § 763, Appendix E to Subpart E, for the identification of asbestos in bulk samples.\*

*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 (TSI)* 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.

*Transmission electron microscopy (TEM)* refers to the method outlined in 40 CFR § 763, Appendix A to Subpart E, for the identification of asbestos in air samples.\*

*Vibration* means the periodic motion of friable ACBM which may result in the release of asbestos fibers.

## **Appendix B - Acronyms**

ACM - Asbestos-containing material

ACBM - Asbestos-containing building material

AHERA - Asbestos Hazard Emergency Response Act

DOT - Department of Transportation

DP - AHERA Designated Person

EPA - U.S. Environmental Protection Agency

HEPA - High-efficiency particulate air

LEA - Local Education Agency

NIOSH - National Institute for Occupational Safety and Health

NIST - National Institute of Standards and Technology

NVLAP - National Voluntary Laboratory Accreditation Program

O&M - Operations and maintenance

OSHA - Occupational Safety and Health Administration

PCM - Phase contrast microscopy

PLM - Polarized light microscopy

TEM - Transmission electron microscopy

TSI - Thermal system insulation

**SECTION 9**

**EPA THE ABC's OF ASBESTOS IN SCHOOLS**





United States  
Environmental Protection  
Agency

Revised  
August 2003

Office of Pollution Prevention and Toxics

# The ABCs Of Asbestos In Schools

Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj

Today's Lesson:

Asbestos



**Recycled/Recyclable**

Printed with Vegetable Oil-Based Inks on Recycled Paper  
(Minimum 50% Postconsumer) Process Chlorine Free



## Introduction

- When is asbestos a problem?
- What should my school and school district be doing about asbestos?
- What can I do to help?

The Environmental Protection Agency (EPA) is releasing this updated document in conjunction with the National Parent Teacher Association (PTA) and the National Education Association (NEA) due to an ongoing concern about asbestos in elementary and secondary schools nationwide.

This pamphlet can help parents and teachers answer questions and learn the facts about asbestos in schools. It also outlines the responsibilities of school boards and other school officials to protect school children and employees from possible exposure to asbestos.

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## The Asbestos Issue

**A**sbestos fibers can cause serious health problems. If inhaled, they can disrupt the normal functioning of the lungs. Three specific diseases – asbestosis, lung cancer, and another cancer known as mesothelioma – 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, the more asbestos fibers a person inhales, the greater the risk of developing an asbestos-related disease. The most severe health problems from asbestos exposure have been experienced by some workers who held jobs in industries such as shipbuilding, where they were exposed to very high levels of asbestos in the air. These employees worked directly with asbestos materials on a regular basis as a part of their jobs. Much uncertainty surrounds the risk from

exposure to low levels of asbestos fibers.

Nevertheless, the risk of school children being exposed to even low levels of asbestos is a concern. Acting on this concern, Congress passed the Asbestos Hazard Emergency Response Act (AHERA) in 1986 to protect school children and school employees from exposure to asbestos in school buildings. This pamphlet describes key parts of these federal asbestos requirements for schools.



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## What Exactly Is Asbestos?

**A**sbestos is a mineral found in certain types of rock formations. When mined and processed, it takes the form of very small fibers which are usually invisible to the naked eye. A typical asbestos fiber is 1,200 times smaller than a strand of human hair. These individual fibers are generally mixed with a material which binds them together so that they can be used in many different products. Because the fibers are so small and light, they can remain in the air for many hours if they are released from asbestos-containing material. This increases the chance that someone will inhale them.

Asbestos became a popular commercial product because it is strong, won't burn, resists corrosion, and insulates well. Its commercial use in the United States began in the early 1900s, when it was used as insulation in steam engines. Since then asbestos has been used to create about 3,000 different products, including insulation and fireproofing. The peak years of asbestos use in schools were from World War II until the 1970s.



## Where Is Asbestos Likely to Be Found?

**E**PA estimates that there are asbestos-containing materials in most of the nation's primary, secondary and charter schools. Asbestos is most commonly used in schools as insulation and in building materials. It has also been used in floor and ceiling tile, cement asbestos pipe, corrugated paper pipe wrap, acoustical and decorative insulation, pipe and boiler insulation, and spray-applied fireproofing. The fluffy white substance you may find above a dropped ceiling, for example, is one type of spray-applied material. The amount of asbestos in

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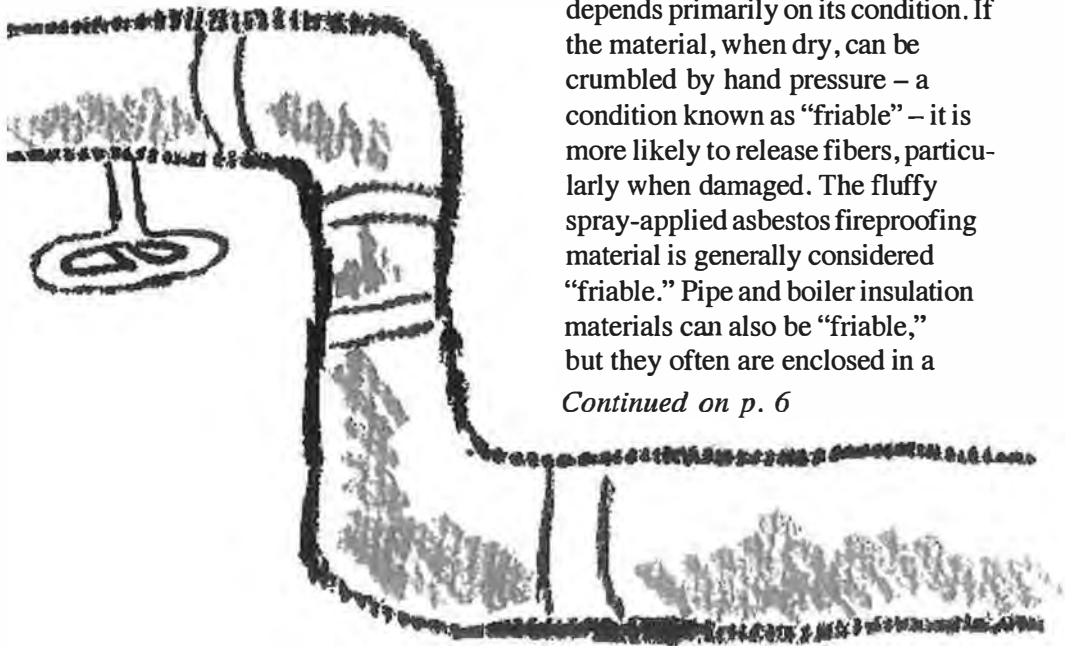
these products varies widely, from less than 1 to 100 percent, depending on the use. Pipe and boiler insulation typically contains more asbestos than other building materials. The precise amount of asbestos in a product cannot always be determined from labels – since most products used in the past were not labeled – or by asking the manufacturer. Instead, positive identification of asbestos requires analysis of samples by a qualified laboratory.

## When Is Asbestos a Problem?

**I**ntact and undisturbed asbestos materials generally do not pose a health risk. Asbestos materials, however, can become hazardous when, due to damage or deterioration over time, they release fibers. If the fibers are inhaled, they can lead to health problems.

The potential for an asbestos-containing material to release fibers depends primarily on its condition. If the material, when dry, can be crumbled by hand pressure – a condition known as “friable” – it is more likely to release fibers, particularly when damaged. The fluffy spray-applied asbestos fireproofing material is generally considered “friable.” Pipe and boiler insulation materials can also be “friable,” but they often are enclosed in a

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## What Is the Government Doing about Asbestos In Schools?

**T**he federal government has been regulating asbestos for a number of years. Progress is being made to limit the uses of asbestos and to identify substitute materials.

AHERA required EPA to develop regulations creating a comprehensive framework for dealing with asbestos in public and nonprofit private elementary and secondary schools. The regulations were published on October 30, 1987.

The AHERA schools rule requires all public school districts and private schools, known as local education agencies or LEAs, to inspect all school buildings for both friable and nonfriable asbestos; to develop plans to manage asbestos in schools; and to carry out the plans in a timely fashion. The rule also provides an opportunity for parents, teachers, and other

school employees to become familiar with and involved in their school's asbestos management program. School officials are required to notify parent, teacher and employee groups about asbestos-related activities.

EPA also has established an asbestos-in-schools assistance program. Through its Headquarters office in Washington, D.C., and ten Regional offices, EPA provides direct technical assistance to help thousands of school officials and workers understand asbestos issues. EPA is updating older asbestos publications and plans to release new materials as they become available. For more information contact your regional asbestos coordinator, the TSCA Hotline at (202) 554-1404 or the asbestos hotline at (800) 471-7127. You can also visit our website at [http://www.epa.gov/asbestos/asbestos\\_in\\_schools.html](http://www.epa.gov/asbestos/asbestos_in_schools.html).

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protective casing which prevents fiber release unless the casing is damaged. Some materials, which are considered “nonfriable,” such as vinyl-asbestos floor tile, can also release fibers when sanded,

sawed or otherwise disturbed. Materials such as asbestos cement pipe can release asbestos fibers if they are broken or crushed when buildings are demolished, renovated or repaired.

## What Are the Proper Methods for Managing Asbestos?

**M**ost asbestos-containing material can be properly managed where it is. In fact, asbestos that is managed properly and maintained in good condition appears to pose *relatively little risk* to students and school employees. Accordingly, the AHERA schools rule rarely requires the removal of asbestos materials.

Proper asbestos management begins with a comprehensive inspection by qualified, trained and experienced inspectors, accredited through an EPA or state-approved training course. Inspecting the condition of asbestos materials – initially with AHERA-accredited inspectors and at least semi-annually with trained custodial or maintenance staff – is extremely important so that changes in the material’s condition, such as

damage or deterioration, can be detected and corrected before the condition worsens. Sometimes normal school or maintenance activities can damage asbestos material and cause fiber release, particularly if the material is “friable.” A thorough initial inspection and regular surveillance can prevent accidental exposure to high levels of asbestos fibers.

The methods (see page 7), in AHERA terminology, are asbestos “response actions.” The last three methods of response actions – encapsulation, enclosure, and removal – and sometimes the second method – repair – must be done by accredited asbestos professionals.

The final response action, asbestos removal, is generally necessary only when the material damage is extensive and severe,



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## How To Respond?

Proper methods for dealing with asbestos are:

- Developing and carrying out a *special maintenance* plan to insure that asbestos-containing materials are kept in good condition. This is the most common method when the materials are in good condition at the time of initial inspection.
- *Repairing* damaged pipe or boiler covering, which is known as thermal system insulation.
- Spraying the material with a sealant to prevent fiber release – a process called *encapsulation*.
- Placing a barrier around the materials, which is known as an *enclosure*.
- *Removing* asbestos – under special procedures.



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and other actions will not control fiber release. Although the AHERA schools rule does not prohibit schools from removing any asbestos materials, removal decisions should not be made lightly. An ill-conceived or poorly conducted removal can actually *increase* rather than eliminate

risk. Consequently, all school removal projects must be designed, supervised, and conducted by accredited professionals and should be performed in accordance with state-of-the-art procedures. In addition, schools may wish to hire an experienced and qualified project monitor to

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oversee the asbestos contractor's work to make sure the removal is conducted safely.

Only an AHERA-accredited management planner – an asbestos professional with proper training, qualifications, and experience – is

authorized to advise school officials on which response action is appropriate for a particular situation. The final selection of the proper method is up to school officials after they receive the advice of the school's accredited management planner.

## What Should My School & School District Be Doing?

**U**nder the AHERA schools rule, each local education agency (LEA, which means a school district or private school) must take the following asbestos-related actions:

- 1** Designate and train a person to oversee asbestos-related activities in the school system.
- 2** Inspect *every* school building for “friable” and “nonfriable” asbestos-containing building materials.
- 3** Prepare a management plan for managing asbestos and controlling exposure in each school.
- 4** Consult with accredited inspection and management professionals

to identify and carry out whatever asbestos actions are necessary and appropriate to protect health and the environment. These actions or methods must be documented in the management plan.

- 5** Notify the public about the asbestos inspection and the availability of the asbestos management plan for review.
- 6** Use only properly accredited persons to conduct inspections, to develop the asbestos management plan, and to carry out the appropriate response actions.
- 7** Keep records of all asbestos related activities in the plan and make them available for public review.

g Hh li Jj Kk Ll M



## What Does the LEA Designated Person Do?

School officials may choose a consultant or one of their own employees to oversee their asbestos program. This designated person must meet certain training requirements, and serves as the single point of contact for public information about asbestos-related activities in the LEA. He or she is responsible for:

- Ensuring that initial asbestos inspections, re-inspections every three years, and semi-annual surveillance activities are conducted properly by qualified personnel.
- Including results of the inspection in the management plan. The plan must identify all asbestos-containing building materials found in schools and recommend actions for dealing with asbestos hazards.
- Preparing a management plan (for schools built after October 12, 1988) for submission to the appropriate state Agency prior to the school being used as a school building. The management plan should be maintained and updated with records of response actions, periodic surveillance of asbestos containing materials (ACM) and all re-inspections.
- Making sure that custodial and maintenance workers receive required safety training and information about the location of asbestos-containing materials in their school. Warning labels must be posted in all routine maintenance areas, such as boiler rooms, where asbestos-containing building materials are found.
- Ensuring that response actions specified in the management plan are carried out according to the plan's timetables. The regulations require that all LEAs were to begin to carry out their management plans no later than July 9, 1989.
- Seeing that all asbestos records required by the regulations are accurately maintained.
- Informing all teacher, parent and employee organizations at least once a year about the asbestos activities in each school and about the availability of the management plan for their review.

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## What Can I Do to Help?

**A**s a parent, teacher, student, service worker or other school employee, the most important thing you can do first is to learn about your school's asbestos activities. As you do so, remember that *the mere presence of asbestos in a school doesn't necessarily mean that the health of its occupants is endangered.* Again, asbestos that is managed properly and maintained in good condition poses relatively little risk. Federal regulations do not require the removal of all friable asbestos from schools until the building is demolished. In fact, during the life of the building, other methods of dealing with the material are often preferable to removal.

In those cases when removing asbestos *is* determined to be the appropriate

decision, the work must be done under strict controls by trained, qualified and experienced asbestos professionals who are properly accredited under AHERA.

### Step One: Awareness

Your first step is to make sure your school has prepared an asbestos management plan as required by AHERA. By becoming familiar with this plan, you will know if asbestos materials are in the school, what plans the school has for managing this asbestos, and when these activities are scheduled to occur.

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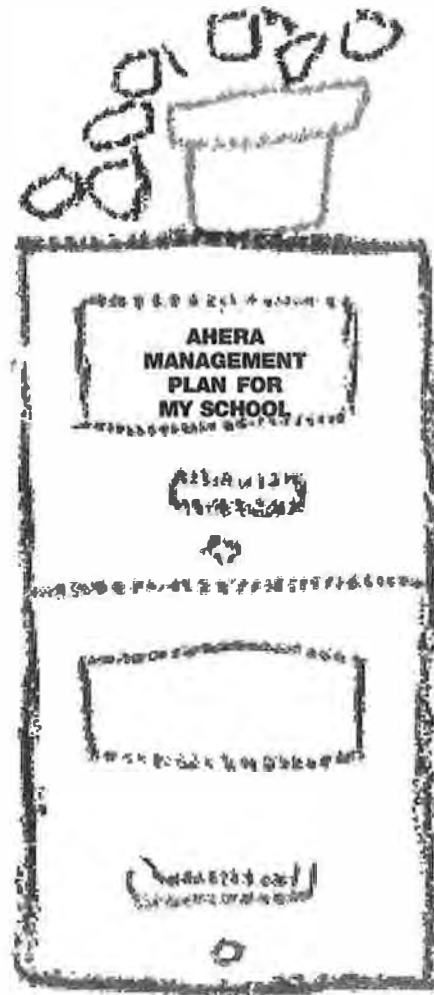
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## Step Two: Minimize Disturbance

There are several simple things you can do to minimize your exposure to asbestos. The most important one is to find out which materials in your school contain asbestos; you should be able to get this information from your LEA's designated person or from the school's management plan.

Once you know where asbestos is, use special care to insure that any day-to-day activities, such as repair or maintenance work, do not disturb the material. In fact, special training is required to participate in any maintenance activities which might disturb asbestos. In schools, asbestos-containing materials can also be damaged by student activities. For example, an asbestos ceiling in a gym may be disturbed if basketballs or other

objects are thrown up against it. Students and others who use the gym should be warned to avoid such activities.



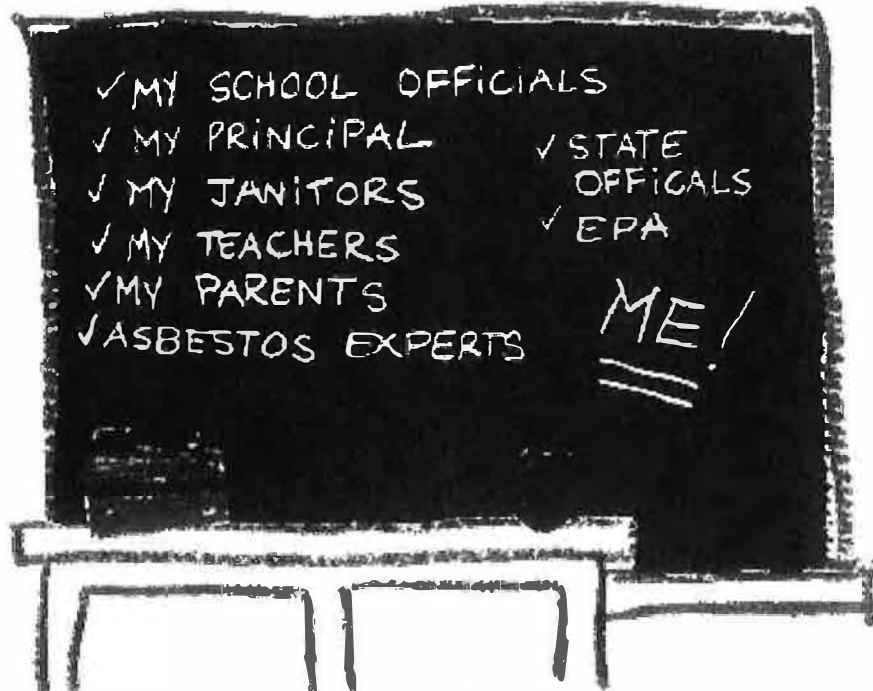
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## Who Is Responsible for Making AHERA Work?

**A**ll of us are responsible. Making the AHERA schools rule work to protect the nation's school children and employees is a joint responsibility of the LEA and its officials, school employees, parents, students,

federal and state governments, and asbestos control professionals.

EPA conducts compliance inspections of a sample of schools each year to make sure they are obeying the law. The Agency is responsible for insuring that schools comply with AHERA and it will investigate reported violations. Since the AHERA schools rule is intentionally designed to involve parent, teacher and other school employee organizations, it is important that *you* work with your school to make sure that its asbestos program is properly conducted.



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## g Hh Ii Jj Kk Ll Mm Nn

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### Where Can I Get More Information?

**U**nder AHERA, citizens have the opportunity to become informed about asbestos activities in their schools. If you have a question or concern about those activities, you should first contact your LEA designated person. This person knows the most about the asbestos situation in your school. When you find out who this person is, ask him or her what steps your school has taken, and will continue to take, to meet the requirements of the AHERA schools rule.

The LEA designated person also can tell you which agency in your state government is responsible for state AHERA activities. The same agency usually is responsible for reviewing the LEA's asbestos management plan. This LEA designated person also should be aware of any local asbestos control requirements.

State AHERA designees also are a good source of information. These officials can help you better understand the AHERA schools rule



and can answer questions about your school's asbestos activities.

You also can contact your EPA regional office. There are ten EPA regional offices around the country, and each one has a Regional Asbestos Coordinator (RAC). Their addresses and phone numbers are listed at the end of this pamphlet. School employees cannot be penalized for contacting EPA or the appropriate state agency to discuss their concerns about a school's asbestos program.

Local, state, and national parent and teacher organizations are other good sources of information about asbestos in schools. Many of these

groups worked with EPA in developing the AHERA schools rule, and some have started their own educational efforts to improve understanding of the AHERA requirements and proper asbestos control practices. The addresses and phone numbers of the national offices of PTA and NEA are listed at the end of this pamphlet.

The EPA Toxic Substances Control Act (TSCA) Hotline is available to answer your questions about the new AHERA regulations and about asbestos in general. You can obtain a variety of information by calling the TSCA Hotline at (202) 554-1404 or the asbestos hotline at (800) 471-7127. You can also visit our website at [http://www.epa.gov/asbestos/asbestos\\_in\\_schools.html](http://www.epa.gov/asbestos/asbestos_in_schools.html).

Finally, EPA has an asbestos ombudsman to help citizens with asbestos-in-schools issues, questions, and complaints. This office can be reached through a toll-free number at (800) 368-5888.



## EPA Regions

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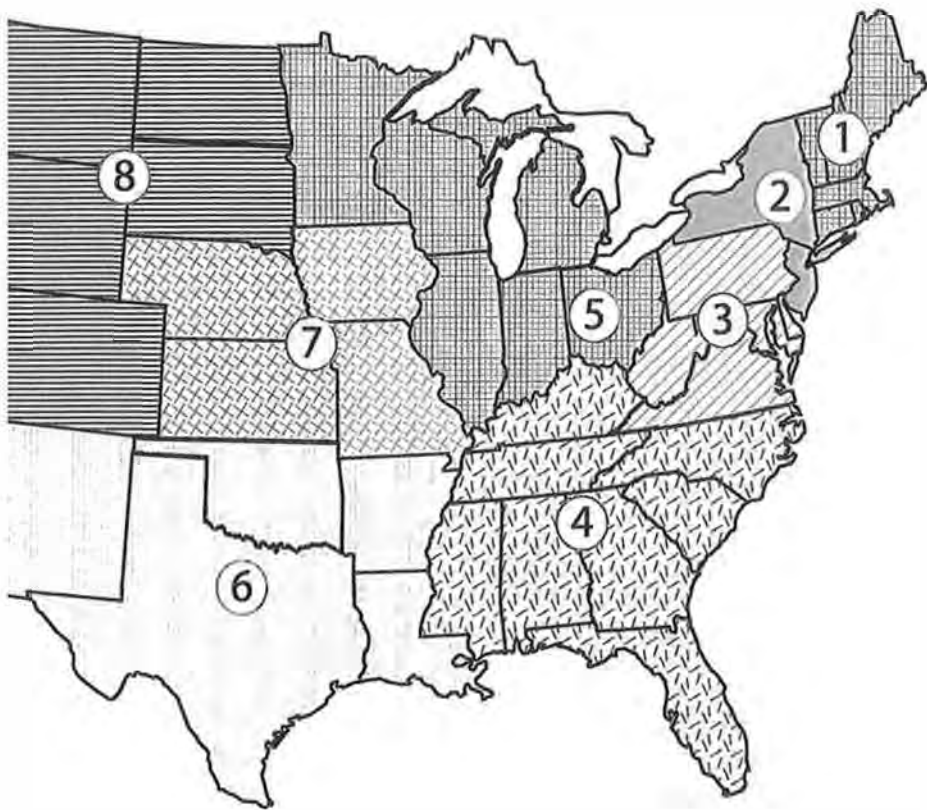
### **EPA Region 1**

One Congress Street  
Suite 1100  
Boston, MA 02114  
Phone: (617) 918-1111  
(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont)

### **EPA Region 2**

Air Branch  
290 Broadway, 21st Floor  
New York, NY 10007  
Phone: (212) 637-3000  
(New Jersey, New York, Puerto Rico, and Virgin Islands)





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**EPA Region 3**  
1650 Arch Street  
Philadelphia, PA 19103  
Phone: (215) 814-5000  
(Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia)

**EPA Region 4**  
461 Forsyth Street, SW  
Atlanta, GA 30303  
Phone: (404) 562-9900  
(Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee)

**EPA Region 5**

77 West Jackson Blvd.  
Chicago, IL 60604  
Phone: (312) 353-2000  
(Illinois, Indiana, Michigan,  
Minnesota, Ohio, and Wis-  
consin)

**EPA Region 6**

1445 Ross Avenue  
Dallas, TX 75202  
Phone: (214) 665-2200  
(Arkansas, Louisiana, New  
Mexico, Oklahoma, and  
Texas)

**EPA Region 7**

901 N. 5th Street  
Kansas City, KS 66101  
Phone: (913) 551-7003  
(Iowa, Kansas, Missouri, and  
Nebraska)

**EPA Region 8**

999 – 18th Street, Suite 300  
Denver, CO 80202  
Phone: (303) 312-6312  
(Colorado, Montana, North  
Dakota, South Dakota, Utah,  
and Wyoming)

**EPA Region 9**

75 Hawthorne Street  
San Francisco, CA 94105  
Phone: (415) 947-8000  
(Arizona, California, Hawaii,  
Nevada, American Samoa,  
and Guam)

**EPA Region 10**

1200 Sixth Street  
Seattle, WA 98101  
Phone: (206) 553-1200  
(Alaska, Idaho, Oregon, and  
Washington)

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**National Parent Teacher  
Association**

National PTA  
330 N. Wabash Avenue  
Suite 2100  
Chicago, IL 60611  
1-800-307-4782

National PTA  
DC Office  
1090 Vermont Avenue, NW  
Suite 1200  
Washington, DC 20005  
(202) 289-6790

Hotline: 1-888-425-5537

---

**National Education  
Association**

NEA  
1201 16th Street, NW  
Washington, DC 20036  
Division of Government Relations  
(202) 822-7300  
or  
Office of General Counsel  
(202) 822-7035

Prepared by the  
U.S. Environmental Protection Agency

**nea** The National  
Education Association

 The National Parent  
Teacher Association



(7404T)

United States

Environmental Protection Agency

Washington, DC 20460

Official Business

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**SECTION 10**

**OPERATIONS AND MAINTENANCE PLAN AND FLOW CHART**

## **Section 10 - O&M Plan and Flow Chart**

The purpose of this section of the Inspection Report is to provide Operations and Maintenance (O&M) personnel the information needed to perform their normal tasks and reduce the risk of Asbestos exposure, and to lessen the chance of creating an Asbestos fiber release episode, and contamination of the building and exposure to its occupants. When Asbestos is present, an O&M plan is an important safety program; and is designed to protect employees and to reduce the facility's potential liability.

**Note: Anytime that maintenance personnel, custodians, or outside contractors are required to perform duties that will impact building materials and/or systems they must refer to this section. If it is unclear if the building material to be impacted is Asbestos-containing or not, immediately contact the Asbestos Coordinator for the school for clarification. Under no circumstances are building renovations/repairs to proceed until the material is determined to be non-ACM.**

When an outside contractor is hired to perform custodial, maintenance, or repair work, including plumbing, mechanical, electrical, roofing, etc., the contractor should obtain authorization from the Asbestos Coordinator to proceed. At that time, the Asbestos Coordinator would inform the contractor whether the project could disturb ACMs, provide special instructions to avoid disturbing or damaging existing ACMs, or arrange for proper abatement of ACMs by a licensed contractor. The Asbestos Coordinator should routinely and frequently check the work performed by contractors, custodial, and maintenance staff. By maintaining close surveillance over these activities, the Asbestos Coordinator can help to prevent disturbance of ACMs.

Employees are required to notify the Asbestos Coordinator of any activities that may impact ACMs through the use of the "Maintenance Work Clearance Form" that could lead to a potential release of Asbestos fibers. Clear and effective communications between the Asbestos Coordinator and employees, as well as outside contractors, is crucial to the success of the O&M plan.

## **Maintenance/renovation Screening System**

An integral part of the O&M program is a communication system that controls all activities that could disturb ACMs. The Asbestos Coordinator shall review all planned maintenance/renovation projects at the facility for the potential to disturb ACMs. For those projects in which ACMs must be disturbed, a licensed abatement contractor will be retained to perform the required work. For projects in which disturbance of ACMs is not necessary, but an inadvertent possibility, a determination shall be made as to the adequacy of ordinary precautionary measures, or for the need to conduct Asbestos abatement prior to the commencement of work. Should removal of ACM be necessary, a licensed Asbestos abatement contractor will be retained to conduct the work prior to commencement of planned maintenance or renovation activities. **Any Asbestos abatement activity (Response Action) must be designed by an accredited Asbestos Project Designer.**

Preparation of a detailed specification will reduce the chance of regulatory and contractual problems. The specification should address the scope of the project including engineering drawings, work procedures, monitoring requirements, and applicable regulations. Standard specifications for Asbestos abatement activities are available from the National Institute of Building Sciences (National Institute of Building Sciences, 1988).

The revised OSHA standard for the construction industry clearly places the responsibility for compliance with the building owner as well as the contractor. Using this reasoning, School officials could be held liable for the actions of their contractors. Therefore the scrutiny of contractors conducting activities that could impact ACM or O&M activities is warranted.

In order to document the screening of maintenance and renovation work, the EPA recommends the use of a maintenance work clearance form. The form developed for use by SAU #66 is provided in **Section 11**, and will be used by the APC to document that planned maintenance and renovation projects are appropriately reviewed and that appropriate measures are taken should the work involve the disturbance or potential disturbance of ACMs.

Should the need arise to sample suspected ACMs as part of maintenance/renovation activities, samples will be collected by an Asbestos Inspector that has been accredited by the EPA through three days of training in accordance with the EPA Model Accreditation Plan.

## **Responding to “Asbestos incidents”**

Where the potential exists for Asbestos fibers to be released into the building atmosphere, due to unforeseen damage or disturbance to ACMs, the area will be vacated, secured, and isolated from employees. The implementation of this O&M plan, including periodic ACMs surveillance and review of outside contractor work procedures, should greatly reduce the likelihood of a fiber release interfering with daily facility operations. Planned renovations and maintenance activities greatly increase the potential for disturbance of ACMs. If a release of ACMs has occurred, the employee that observes the release will implement the following procedures:

- Notify the Asbestos Coordinator immediately. It will be the responsibility for employees to immediately notify the Asbestos Coordinator should an employee notice and/or cause a potential fiber release episode.

The Asbestos Coordinator will then implement the following procedures:

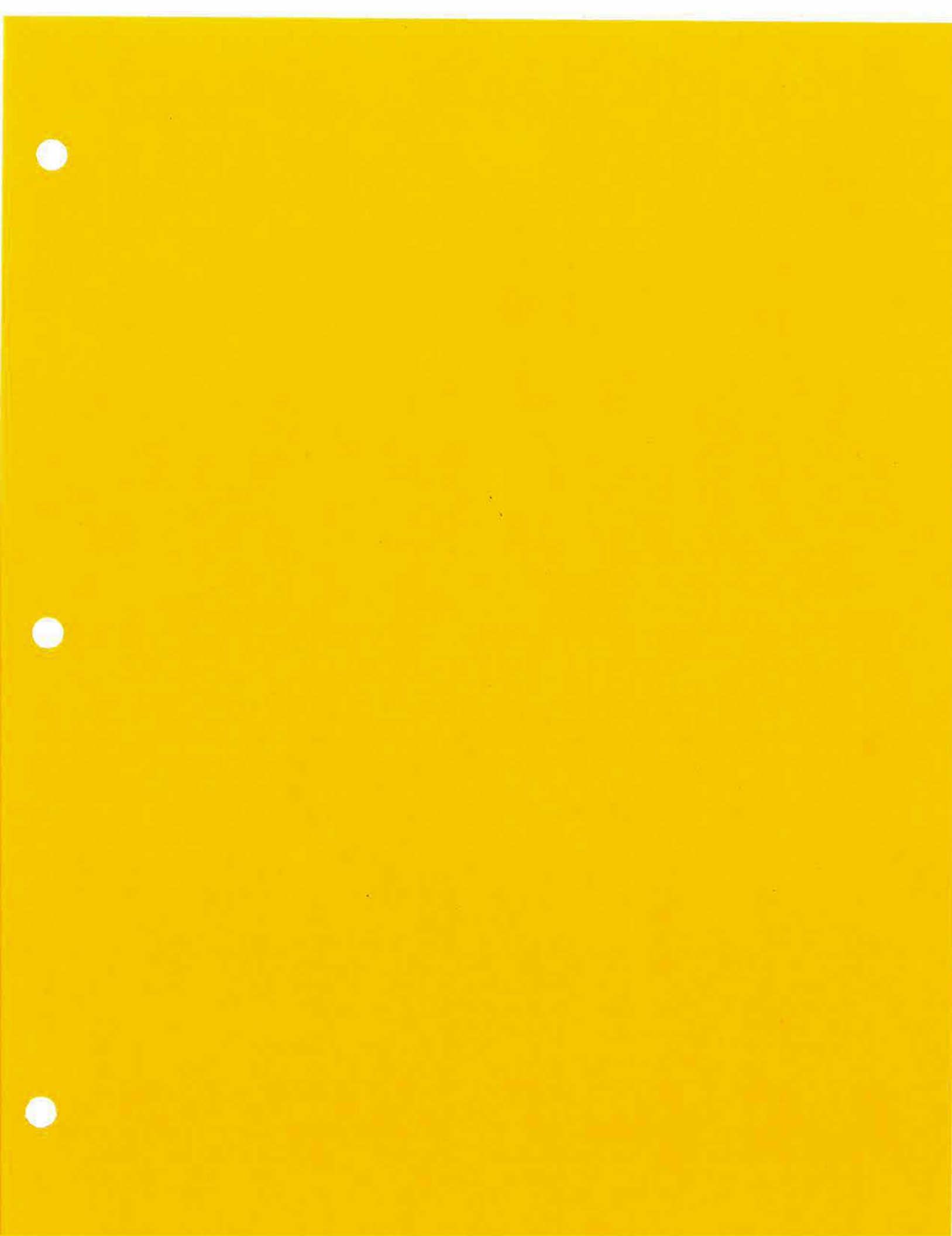
- Restrict access to the area;
- Review Asbestos Inspection reports and Re-inspection documents to determine if ACMs have been identified within the area; and
- Contact the designated Environmental/Asbestos Consultant.

If a release of ACMs occurs, an Environmental/Asbestos Consultant should consult with the Asbestos Coordinator to coordinate the following action items:

- Develop a Project Scope-of-Work (SOW) to address the release; and
- Contract with a licensed Asbestos Contractor to complete the work, and ensure the selected contractor notifies the State of New Hampshire to allow abatement/clean-up activities to be implemented as soon as possible.

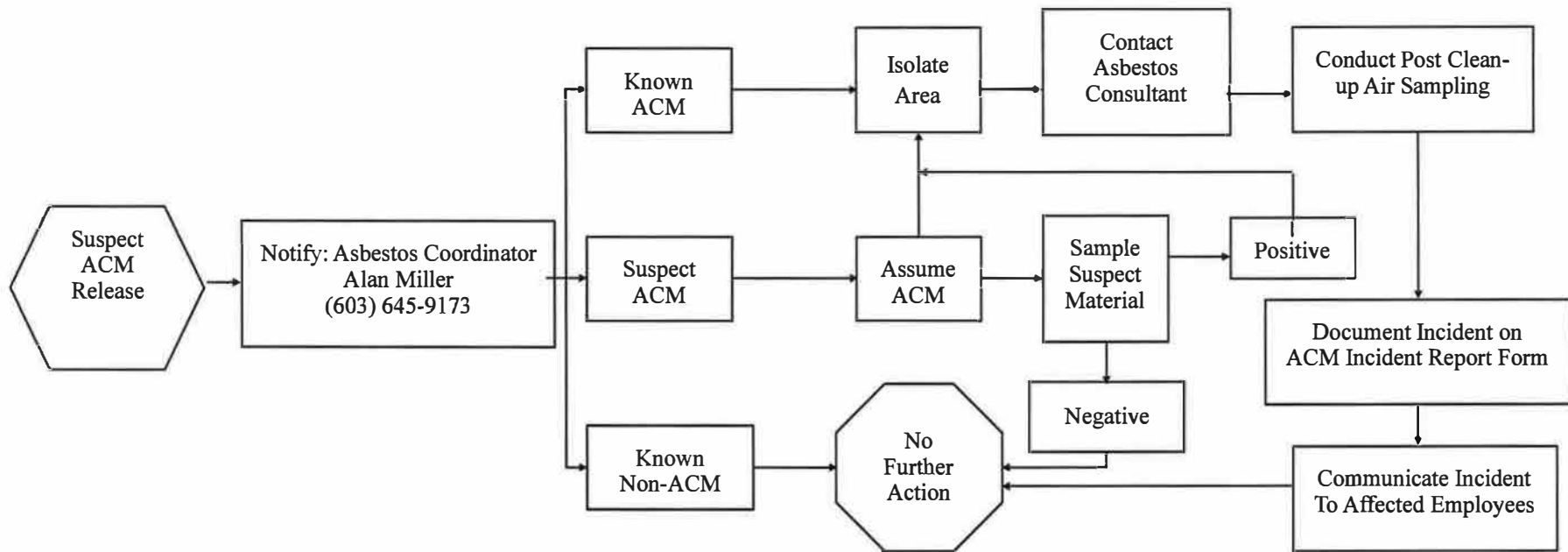
The Asbestos Coordinator will follow-up the incident by completing an Asbestos Incident Report. A copy of this form is included in Section 10.





## SECTION 10 - Flow Chart

### Flowchart, Reporting and Responding to Asbestos Related Incidents



**SECTION 11**

**ASBESTOS INCIDENT REPORT FORM**

**MAINTENANCE WORK CLEARANCE FORM**

**SAU #28-Pelham School District  
Pelham High School  
Asbestos Operations & Maintenance Program  
Asbestos Incident Report**

**DESCRIPTION OF ASBESTOS-RELATED INCIDENT**

Date/Time of Incident: \_\_\_\_\_

Description, nature of fiber release, personal injury or exposure, property damage, or other pertinent aspects of the incident:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name(s) of individuals directly involved in the incident:

1) Name: \_\_\_\_\_  
Nature of involvement with incident: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2) Name: \_\_\_\_\_  
Nature of involvement with incident: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3) Name: \_\_\_\_\_  
Nature of involvement with incident: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Describe immediate actions taken in response to incident: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Describe the employee or contractor activity involved with the incident (if applicable): \_\_\_\_\_

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Describe any tools or machinery involved: \_\_\_\_\_

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**EXHIBITS**

List the documents, photographs (if present) and other exhibits accompanying this form:

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**CAUSATIVE FACTORS:**

Summarize the IMMEDIATE AND CONTRIBUTORY CAUSES of the incident: \_\_\_\_\_

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**RECOMMENDATIONS**

Recommendations for repair or removal of ACMs, and any recommended changes in process, procedure, equipment or other recommendations, to correct a situation and/or prevent the incident in the future:

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**CORRECTIVE ACTIONS**

Identify corrective actions and dates corrected:

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\_\_\_\_\_  
Signature - Asbestos Program Coordinator

\_\_\_\_\_  
Date

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This not only helps in tracking expenses but also ensures compliance with tax regulations.

In the second section, the author provides a detailed breakdown of the company's revenue streams. This includes sales from various product lines and services. The data shows a steady increase in revenue over the past year, which is attributed to strategic marketing efforts and product diversification.

The third section focuses on the company's operational costs. It details the expenses related to production, distribution, and administrative functions. The analysis reveals that while production costs have remained relatively stable, distribution costs have increased due to higher fuel prices and logistics challenges.

Finally, the document concludes with a summary of the overall financial performance. It highlights the company's strong profitability and its ability to manage costs effectively. The author expresses confidence in the company's future growth and success.

**SAU#28-Pelham School District  
Pelham High School  
Maintenance/Renovation Work Clearance Form**

---

**This Section to be completed by person requesting Work Clearance**

Location of Work: \_\_\_\_\_ Date: \_\_\_\_\_

Description: \_\_\_\_\_  
\_\_\_\_\_

Will the work described impact known or suspect ACMs?: Yes  No

If yes, what are the ACMs to be impacted: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

---

**This Section to be completed by Asbestos Program Coordinator**

Can work be conducted without impacting known or suspect ACMs?: Yes  No

If no, what response actions/controls will be taken? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Work cleared to proceed without response action or controls?: Yes  No

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Signature – Clearance Requestor Date

\_\_\_\_\_  
Signature - Asbestos Program Coordinator Date



**SECTION 12**

**PELHAM HIGH SCHOOL TRAINING DOCUMENTATION**

**SECTION 13**

**SAU #28 - PELHAM HIGH SCHOOL**

**ANNUAL NOTIFICATION TO PARENTS, TEACHERS,  
EMPLOYEES, AND PUBLIC**

State Of New Hampshire  
School Administrative Unit No. 28

Office of the Superintendent

MARSH ROAD PELHAM, N.H. 03076 603-635-2101

FRANK A. KAFFEL

Ass't. Superintendent for Business

HENRY E. LaBRANCHE

Superintendent of Schools

KATHERINE B. ENWRIGHT

Director of Special Services

June 20, 1984

Pelham School District  
Pelham, NH 03076

Dear parents and staff members:

On May 27, 1982, the U.S. Environmental Protection Agency (E.P.A.) published a rule in the Federal Register, Vol. 47, page 23360 to 23389, requiring all public and private elementary and secondary schools in the United States to identify friable asbestos-containing materials, maintain records and notify employees of the location of the friable materials which contain asbestos. When friable asbestos-containing materials are found, schools must provide for reducing exposure to air borne asbestos, and notify the schools' parent-teachers' association.

This letter is to inform you that asbestos-containing materials have been located in the Sherburne, Memorial, and Pelham High Schools. The three schools in the Pelham School District are now in compliance with all E.P.A. asbestos regulations.

Please contact the office of the Superintendent of Schools, 635-2101, if you have any questions or concerns.

Sincerely,



Henry E. LaBranche  
Superintendent of Schools

HEL:dlo

**SECTION 14**

**SAU #28 - PELHAM HIGH SCHOOL**

**AHERA DESIGNATED PERSON STATEMENT OF RESPONSIBILITIES**

**6-MONTH REINSPECTION FORM**

## Sample AHERA Designated Person Statement of Responsibilities

### LOCAL EDUCATION AGENCY (LEA) GENERAL RESPONSIBILITIES UNDER AHERA

Pursuant to Section 763.84 and Section 763.93 of the EPA Asbestos in Schools Regulation (40 CFR Part 763), each management plan must contain a true and correct statement, signed by the LEA designated person, that certifies that the general LEA responsibilities have been met. This form is provided to assist you in complying with this portion of AHERA.

LEA Name \_\_\_\_\_

LEA Address \_\_\_\_\_

Designated Person Name \_\_\_\_\_

Designated Person Address \_\_\_\_\_

### ASSURANCES

1. This AHERA Management plan was developed and has been submitted pursuant to the Asbestos Hazard Emergency Response Act of 1986. Public Law 99-519; and the United States Environmental Protection Agency Rule: Asbestos Containing Materials in Schools, 40 CFR Part 763; and the undersigned does hereby certify that the LEA has and will ensure the following:

2. 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 Part 763.

3. All custodial and maintenance employees are properly trained as required in Part 763 and all 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).

4. All 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.

5. All warning labels are posted in accordance with Section 763.95.

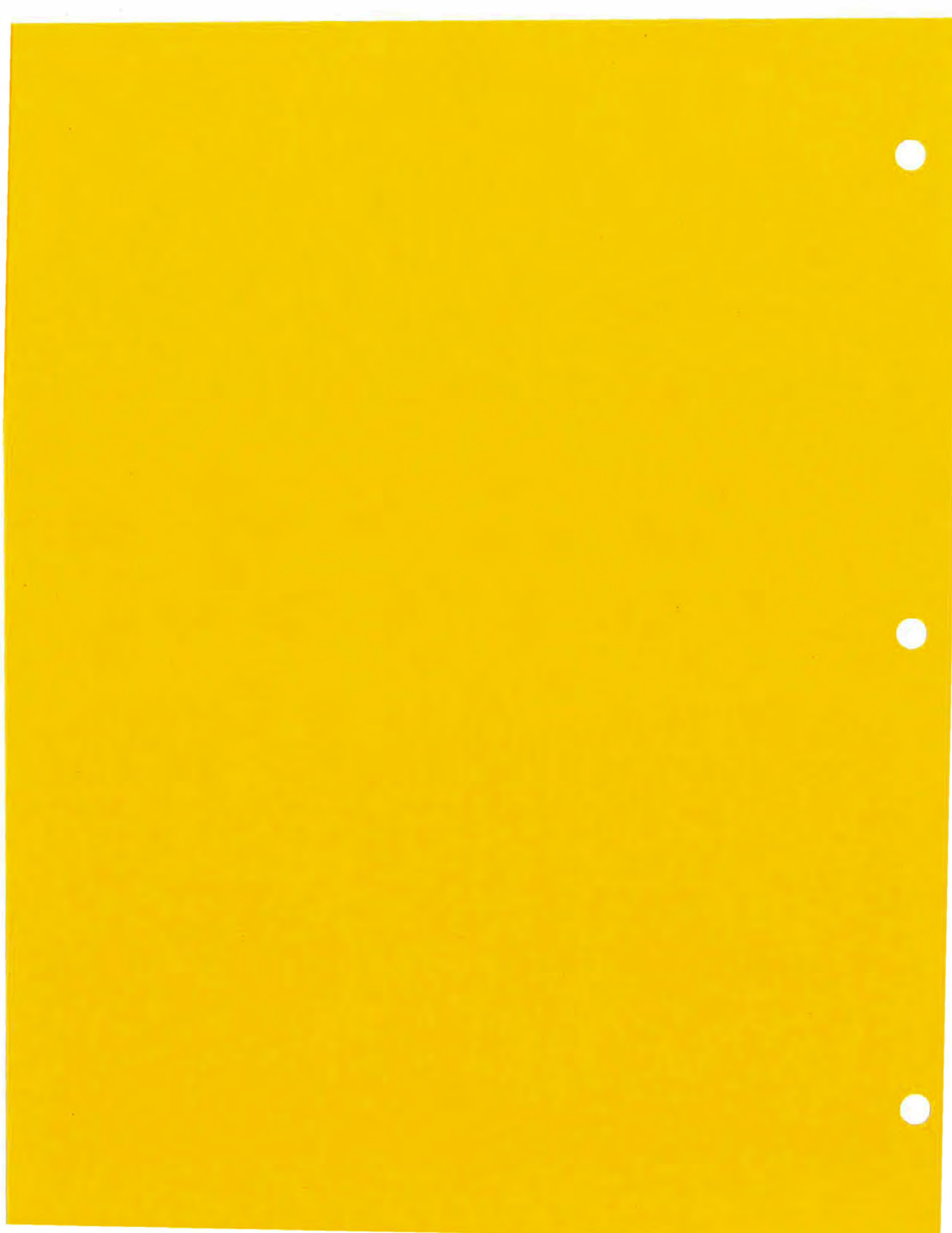
7. All management plans are available for inspection and notification of such availability has been provided as specified in the management plan under Section 763.93(g).

8. The undersigned person designated by the LEA pursuant to Section 763.84(g)(1) has received adequate training as stipulated in Section 763.84(g)(2).

9. The LEA has and will 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 Part 763.

Signature \_\_\_\_\_

Date \_\_\_\_\_



# How to Manage Asbestos in School Buildings AHERA Designated Person's Self Study Guide

*(Modified to include Connecticut Requirements)*

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- D. General Services Administration, Department of Health and Human Services, Occupational Safety and Health Administration
- E. No federal government agencies regulate asbestos

**5. Which of the following are not the responsibility of the Local Education Agency?**

- A. must conduct periodic surveillance in each building under its authority at least once every six months and use an accredited inspector to conduct the reinspections every three years
- B. must attach a warning label immediately adjacent to any friable and nonfriable asbestos-containing building material (ACBM) and suspected ACBM located in routine maintenance areas, such as boiler rooms, at each school building
- C. must send all notification, inspection, and periodic surveillance records to EPA on an annual basis
- D. ensure that complete and up-to-date records of inspections, reinspections, response activities, periodic surveillances, and operations and maintenance activities are maintained
- E. must comply with the notification requirements to workers, students, building occupants, parents, and short-term workers

**6. Which activities must be conducted by an accredited inspector?**

- A. Identify all homogeneous areas of material that are suspected to contain asbestos
- B. Gather information on the uses and functions of the spaces within the homogeneous areas
- C. Collect samples of material suspected to be ACBM and send them to the lab for analysis
- D. Perform a physical assessment of the material and document the results in an inspection report
- E. All of the above activities

**7. Some of the most common uses of asbestos-containing building materials found include:**

- A. Fireproofing on structural members
- B. Plaster, pipe and boiler insulation
- C. Acoustical or sound proofing material
- D. Flooring and ceiling tiles
- E. All of the above

**8. In addition to imposing other requirements, the Asbestos Hazard Emergency Response Act requires that a Local Education Agency:**

- A. Close buildings in which asbestos is found
- B. Perform inspections to identify asbestos-containing building materials in its buildings
- C. Notify the Environmental Protection Agency on the locations of asbestos-containing building materials in the schools of the district
- D. Remove all asbestos-containing building materials from its buildings
- E. B and D



- A. Receive training that provides basic knowledge of a number of asbestos-related subjects, as listed in EPA's asbestos regulations
- B. Complete EPA-or State-approved inspector course and become accredited
- C. Have a college degree
- D. Pass an EPA test on Designated Person roles and responsibilities
- E. Complete no training

**14. An asbestos management program is subject to which EPA statutes and regulations:**

- A. Asbestos Hazard Emergency Response Act
- B. Asbestos Hazard Emergency Response Act, National Emissions Standards for Hazardous Air Pollutants
- C. Asbestos Hazard Emergency Response Act, National Emissions Standards for Hazardous Air Pollutants, EPA Worker Protection Rule
- D. Asbestos Hazard Emergency Response Act, National Emissions Standards for Hazardous Air Pollutants, EPA Worker Protection Rule and Asbestos School Hazard Abatement Reauthorization Act
- E. None of these

**15. Local Education Agencies must conduct the following notifications:**

- A. Annually to parents, teachers, and employee organizations on the availability of the asbestos management plan
- B. Annually to workers, building occupants and their guardians on recent or planned asbestos activities (such as inspections, response action, etc.)
- C. To short-term workers (e.g. telephone repair workers, utility workers, or exterminators) who may come into contact with asbestos on the locations of asbestos-containing building materials (or assumed ACBM)
- D. Annually to EPA or state agencies on updates to the management plan.
- E. A, B, C

**16. The management plan must:**

- A. be kept in the Local Education Agency's administrative office
- B. be kept in the administrative office of each school building
- C. be available to persons for inspection without cost or restriction
- D. be complete and up-to-date
- E. all of the above

|  |
|--|
| 1-A,2-D,3-A,4-B,5-C,6-E,7-E,8-B,9-A,10-C,11-E,12-A,13-A,14-D,15-E,16-E |
|--|

# 1 USING THE SELF-STUDY GUIDE

## *Aim of the Guide*

EPA requires schools to appoint an asbestos management coordinator, called the "AHERA designated person" to be responsible for a number of asbestos-related activities, including the implementation of the plan for managing asbestos-containing building materials (ACBM) in the school buildings and compliance with the federal asbestos regulations.

Even though the AHERA requirements have been in place for some time, EPA inspectors have found misunderstanding and confusion on how to implement the requirements, as well as how to best manage asbestos in school buildings. *EPA has designed this self-study guide to help the designated person understand his or her responsibilities and comply with the federal asbestos requirements.* This manual is recommended for persons recently appointed to the position of AHERA Designated Person, as well as persons who have held the position for some time.

## *Background*

On October 22, 1986, Congress promulgated the Asbestos Hazard Emergency Response Act (AHERA), Public Law 99-519. AHERA mandated that EPA develop regulations to respond to asbestos in schools. On October 30, 1987, EPA promulgated the Asbestos-Containing Materials in Schools Rule (hereinafter referred to as the AHERA Rule), 40 CFR Part 763, Subpart E. This rule requires that all of the nation's nonprofit elementary and secondary schools, both public and private, inspect their school buildings for asbestos-containing building materials (ACBM), develop a plan to manage the asbestos for each school building, notify parents and staff regarding management plan availability, provide asbestos awareness training to school maintenance and custodial workers, and other requirements described in detail in this manual. A list of key responsibilities for school districts is located on page 18. *(Note that certain States consider pre-schools the first step of the elementary education process and therefore have included pre-schools under their State AHERA regulations.)*

The governing authority responsible for AHERA compliance is the Local Education Agency (LEA). "Local Education Agency" means either any local educational agency as defined in Section 198 of the Elementary and Secondary Education Act of 1965 (often called school district), the owner of any private, non-profit elementary or secondary school building, or the governing authority of any school operated under the Defense Department's education system.

In July 1991, EPA released the results of an evaluation of AHERA implementation. The results showed that certain elements of school asbestos programs were not being effectively implemented. The agency concluded that schools needed better guidance on how to run their

- options for controlling asbestos-containing building materials; and
- asbestos management programs.
- relevant Federal and State regulations concerning asbestos, including AHERA and its implementing regulations and the regulations of the Occupational Safety and Health Administration, the U.S. Department of Transportation, and the U.S. Environmental Protection Agency (*See Chapter 11 for further information on regulations related to AHERA.*)

To determine whether reviewing this document would satisfy the training requirements for the DP, school personnel should consult with the regional asbestos coordinator in the EPA Regional Office serving their state.

### *Instructions for Using this Guide*

To use this guide effectively:

- Assemble all documents that appear in the list entitled "Documents Required for Completion of Self-Study Guide."
- Make copies of the tables, figures and supplemental materials that appear in this guide to use as working copies.
- Review the chapter summaries and supplemental materials at the end of each chapter as you proceed through the guide.
- Take the Quiz before and after you have completed this Self-Study Guide.

### *Documents Required for Completion of Self-Study Guide*

A designated person using this guide should have copies of the following documents for reference:

- CT ASBESTOS-CONTAINING MATERIALS IN SCHOOLS, §19a-333-1 through 13
- CT • STANDARDS FOR ASBESTOS ABATEMENT §19a-332a-1 through §19a-332a-16
- CT LICENSURE AND TRAINING REQUIREMENTS FOR PERSONS ENGAGED IN ASBESTOS ABATEMENT AND CONSULTATION SERVICES §20-440-1 through §20-440-9, §20-441

#### Environmental Protection Agency

40 CFR Part 763; *Asbestos-Containing Materials in Schools*; Final Rule (October 30, 1987), the *Model Accreditation Plan*, Interim Final Rule (February 3, 1994), and *Asbestos Abatement Projects; Worker Protection; Final Rule* (February 25, 1987; note: this rule must undergo revision to conform to the OSHA Worker Protection Rule, 29 CFR 1926.1101, 8/10/94).

*100 Commonly Asked Questions About the New Asbestos-in-Schools Rule* (May 1988).

- Your School Asbestos Inspection Report/Management Plan

Choose a document that is representative of your school buildings if you have multiple schools.

# 2

# AN INTRODUCTION TO ASBESTOS

## The History of Asbestos

The word "asbestos" is derived from the Greek language. The Greeks admired the "miracle mineral" because of its softness and flexibility and its ability to withstand heat. The Greeks used asbestos much like cotton, spinning and weaving it into cloth. Asbestos was not widely available anywhere in the world until the late 1800s, when major deposits were found in Canada. Thereafter, asbestos was used to make thermal insulation for boilers, pipes, and other high temperature applications, and was also used as a fireproofing and reinforcement material. During World Wars I and II, the military used asbestos extensively in ships and other applications. Commercial usages of asbestos in buildings increased greatly thereafter, but growing concerns about the health risks associated with asbestos exposure resulted in a voluntary reduction in the use of asbestos beginning in the 1970s.

## Characteristics of Asbestos

Asbestos is comprised of a group of natural minerals. Unlike other minerals, however, the crystals of asbestos form long, thin fibers. Asbestos deposits are found throughout the world, but the primary sites of commercial asbestos production are Canada, Russia, and South Africa. Commercial mining of asbestos in the United States was halted in the 1980s.

Once extracted from the earth, asbestos-containing rock is crushed, milled (or ground), and graded. This produces long, thread-like fibers of material. What appears to the naked eye as a single fiber is actually a bundle of hundreds or thousands of fibers, each of which can be divided even further into tiny fibers (fibrils), invisible without the aid of a microscope.

Asbestos materials are divided into two groups -- *serpentine* and *amphibole*. All asbestos in the serpentine group is called Chrysotile. This is the most common type of asbestos found in buildings in the United States, accounting for approximately 95 percent of the asbestos found in the nation's buildings. It is commonly known as "white asbestos" because of its natural color.

The amphibole group contains five types of asbestos. Amosite, the second most common type of asbestos found in buildings in the United States, is often referred to as "brown asbestos" for the color of the natural mineral. Crocidolite, or "blue asbestos" has been used in high-temperature insulation products and on chemical resistant surfaces, such as laboratory tables for chemistry and biology classes (upon occasion, the custodial staff will drill holes in table tops for new fixtures without realizing that the material may contain crocidolite. The remaining three types of asbestos in the amphibole group -- Anthophyllite, Tremolite, and Actinolite -- are rare and have little commercial value. They are occasionally found as contaminants or minor constituents in asbestos-containing materials.

### Categories of Asbestos-Containing Building Materials

EPA identifies three categories of ACBM (*See the definitions appearing in § 763.83 of the AHERA Rule*):

- **Surfacing Materials** -- Interior ACBM that has been sprayed on, troweled on, or otherwise applied to surfaces (structural members, walls, ceilings, etc.) for acoustical, decorative, fireproofing, or other purposes. This includes acoustical plaster, hard plasters (wall or ceiling), fireproofing insulation, spray-applied or blown-in thermal material, joint or patching compound (wall or ceiling), and textured paints or plasters.
- **Thermal System Insulation** -- Insulation used to control heat transfer or prevent condensation on pipes and pipe fittings, boilers, breeching, tanks, ducts, and other parts of hot and cold water systems; heating, ventilation, and air conditioning (HVAC) systems; or other mechanical systems. These insulation materials include pipe lagging, pipe wrap, HVAC duct insulation, block insulation, cements and muds, and a variety of other products such as gaskets and ropes.
- **Miscellaneous Materials** -- Other, mostly nonfriable products and materials found on structural components, structural members or fixtures, such as floor tile, ceiling tile, construction mastic for floor and ceiling materials, sheet flooring, fire doors, asbestos cement pipe and board, wallboard, acoustical wall tile, and vibration damping cloth. "Miscellaneous materials" do not include thermal system insulation or surfacing materials.

Please note that batt, blanket, and blown-in insulation should be placed in one of the above categories according to use.

# 3

## ASBESTOS HEALTH RISKS

### Health Effects Associated with Asbestos Exposure

The health effects associated with asbestos exposure have been studied for many years. Results of these studies show that inhalation (breathing in) of asbestos fibers leads to increased risk of developing several diseases. Exactly why some people develop these diseases remains a mystery, but it has been well demonstrated that most asbestos-related illnesses are dose-response related (i.e., the greater the exposure to airborne asbestos fibers, the greater the risk of developing an illness).

### Relative Hazards of Asbestos Exposure

Almost daily, we are exposed to some prevailing level of asbestos fibers in buildings or experience some existing level in the outdoor air. Some fibers that are inhaled remain in the lungs. Brief "bursts" of exposure, when added to the background level, increase the potential to cause or trigger the development of an asbestos related disease. These brief bursts of exposure occur in many ways. For example, when a carpenter drills a hole in an asbestos fire door without taking any precautions, an increased amount of asbestos may be released into the air. The more often these bursts of exposure occur, the greater the risk of breathing asbestos fibers.

People most at risk for this additional exposure are maintenance and construction workers who work on and disturb asbestos in buildings. This clearly demonstrates the need for an active asbestos policy and an ongoing operations and maintenance (O&M) plan for buildings that contain ACBM.

*It is important to recognize that the majority of people who have developed diseases because of asbestos exposures are former asbestos workers.* These workers were frequently exposed to high levels of asbestos fibers each working day, with little or no protection. Today's asbestos maintenance workers and AHERA-trained asbestos abatement workers are trained to follow specific work practices and wear appropriate protection, including respirators, to minimize the risk of exposure. However, increased risk may occur when a worker who does not use a respirator or follow specific work practices disturbs any ACBM.

risk of contracting lung cancer as a result of exposure to asbestos increases if the worker is a cigarette smoker. Cigarette smokers who are exposed to asbestos are over 50 times more likely to develop lung cancer than the normal, non-smoking population. As a result, a program to help workers stop smoking and an asbestos operations and maintenance program will help reduce the risk of lung cancer among asbestos maintenance workers.

- **Mesothelioma** -- Mesothelioma is a cancer that occurs in the chest cavity lining or in the lining of the abdominal (stomach) lining. This type of cancer spreads rapidly and is always fatal. Cases of mesothelioma have been found in people who have had a limited exposure to asbestos. The onset of this disease appears to be independent of smoking behavior but related to dose and to time from first known asbestos exposure. Mesothelioma tends to have a long latency period -- usually 30 to 40 years.
- **Other Diseases** -- Several other diseases seem to occur more frequently among people who have been exposed to asbestos. These include cancer of the esophagus, stomach, colon, and pancreas; pleural (fibrous) plaques; pleural thickening; and pleural effusion.

The risks of contracting any of these diseases make it extremely important that asbestos maintenance workers utilize proper work practices and respiratory protection.

### **Risks Associated with Low Exposure**

While studies of asbestos workers and laboratory animals clearly reveal that asbestos is hazardous, the risks associated with low-level, non-occupational exposure (*i.e.*, an occupant of a building who is not actually disturbing the asbestos) have not been directly demonstrated. Estimating low-level risks from exposure data is not a straightforward process, and the validity of current methodologies is questionable.

Based on a thorough review of the literature available on the health effects of asbestos, the National Institute for Occupational Safety and Health (NIOSH) has concluded that there is no level below which the risks of contracting an asbestos-related disease are zero. This means that there is no established safe level of exposure to asbestos.

**Chapter 3 Summary**  
**Key Points About Asbestos Health Risks**

Asbestos-related diseases are dose-response related (the greater the exposure to airborne fibers, the greater the risk of developing an illness) and have a latency period (typically 15 to 30 years).

Exposure to asbestos may result in **asbestosis** (a disease characterized by lung scarring, which reduces the lungs' ability to function), **lung cancer**, **mesothelioma** (always-fatal cancer arising in the chest or abdominal cavity), and **other diseases**.

Risks associated with low-level, non-occupational exposure (e.g., a building occupant who is not actually disturbing the asbestos) are not well established. The National Institute for Occupational Safety and Health (NIOSH) has determined, however, that there is no established safe level of exposure.

Asbestos that has been identified will pose little risk if it is well maintained under an operations and maintenance program. EPA only requires asbestos removal to prevent significant public exposure to airborne asbestos fibers during building demolition or renovation activities.



## Conflicts of Interest

The AHERA Designated Person (school asbestos coordinator) should take into consideration any conflict of interest and determine whether it should influence their selection of contractors to accomplish asbestos related work in their schools. The AHERA Rule identifies several situations where a conflict of interest may arise. For example, the abatement contractor is not allowed to conduct final air sampling for clearance by TEM analysis (*See 40 CFR Part 763, Appendix A to Subpart E ((II)(B)(2))*). The group that determines whether an abatement site is acceptable for re-occupancy should not be the same (or a related group) that is conducting the abatement work. Similarly, if the LEA requires a management planner to sign a statement certifying that the management plan is in compliance with AHERA, then the LEA may not want the planner signing the statement to be the one who implements or will implement the plan. The LEA may have unique concerns regarding potential conflicts that should be discussed with and addressed by the designated person.

### Specific Responsibilities of the LEA

Sections 763.85-763.99 of the AHERA Rule detail the specific responsibilities of the LEA. These responsibilities are listed below, followed by brief descriptions. The responsibilities are discussed in greater detail in subsequent chapters of this guide. •

**Inspections.** -- An accredited inspector must conduct inspections of each school building under the authority of the LEA. This involves visually inspecting buildings for friable and nonfriable ACM, sampling such materials unless they are assumed to be ACM, and having samples analyzed in accordance with the AHERA regulations. Only accredited laboratories may be used to perform bulk material sampling analyses  
§19-333-3

**Reinspections** --An accredited inspector must conduct a reinspection of all friable and nonfriable known or assumed ACM in each school building at least once every three years that a management plan is in effect. A management planner must review all three year inspection reports.  
§19-333-3

CT REQUIRES THAT REINSPECTIONS BE DOCUMENTED ON THE PRESCRIBED FORM within 30 days (see §19-333-3(b)). Additional requirements for reinspection are listed in §19-333-3(b)(1) and §19-333-3(b)(E)

**Assessment** -- For each inspection and reinspection, an accredited inspector must provide a written assessment of all friable known or assumed ACM in the school building.  
§19-333-6

**Management Plans-** -- Each LEA must complete an asbestos management plan for each school under its authority. An accredited management planner must prepare the management plan based on the results of the inspection. In the management plan, the management planner recommends appropriate response actions, prepares cost estimates on the response  
§19-333-10

notification should be documented in the management plan.

A description of all notification processes must be maintained as part of the management plan. The Parent Teacher Association (PTA) or school newsletter may be used as a means to distribute the notifications to the students and their families.

**Periodic  
Surveillance**  
§19-333-10

-- The LEA must conduct periodic surveillance in each building under its authority at least once every six months after a management plan is in effect. The periodic surveillance inspection report must be kept in the management plan.

**Recordkeeping**  
§19-333-11

⊗ -- Records involving the inspection of and response to ACBM must be kept in a centralized location in the administrative office of both the school and the LEA. EPA recommends keeping these records in the management plan for each school building and the overall management plan for all school buildings. Recordkeeping is the responsibility of the designated person. The following records must be kept:

- ⊗ Descriptions of preventive measures and response actions taken for friable and nonfriable ACBM and suspected ACBM
- ⊗ Sampling information
- ⊗ Training information
- ⊗ Periodic surveillance information
- ⊗ Information on initial and additional cleaning performed
- ⊗ Information on operations and maintenance activities, including information on any maintenance activities disturbing friable ACBM
- ⊗ Notifications to parents, building occupants, and short-term workers
- ⊗ Information on any fiber-release episodes

**Warning Labels**  
§19-333-12

--The LEA must attach a warning label immediately adjacent to any friable and nonfriable ACBM and suspected ACBM assumed to-- be ACBM located in routine maintenance areas (such as boiler rooms) at each school building.

**EXCLUSIONS**

CONNECTICUT REGULATIONS- §19-333-13

### General Responsibilities Under AHERA

The AHERA Designated Person must complete and sign a statement that the Local Education Agency has met (or will meet) the responsibilities listed below. All references are to specific provisions to the AHERA regulations (under § 763.84). The AHERA Designated Person should be able to answer "yes" to each statement below.

1. 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 40 CFR Part 763, Subpart E.
2. All custodial and maintenance employees are properly trained as required in 40 CFR Part 763, Subpart E and all 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).
3. All workers and building occupants, or their legal guardians, are informed at least once each school year about inspections, response actions, post-response action activities, including periodic reinspections and surveillance activities, that are planned or in progress.
4. All short-term workers (e.g., telephone repair workers, utility workers, or exterminators) who may come in contact with asbestos in school are provided information regarding the locations of ACBM and assumed ACBM.
5. All warning labels are posted in accordance with § 763.95 and CT §19A-333-12(d).
6. All management plans are available for inspection, and notification of this availability has been provided in accordance with § 763.93(g).
7. The undersigned person designated by the LEA according to § 763.84(g)(1) has received adequate training as required by § 763.84(g)(2).
8. The LEA has and will consider whether any conflict of interest may arise from the interrelationship between accredited personnel, and whether this potential conflict should influence the selection of accredited personnel to perform activities under 40 CFR Part 763, Subpart E.

*(See Example Form 1 at the end of this chapter for an example of how to record information about the homogeneous areas in a school building.)*

### **Functional Spaces**

Once the inspector has identified the homogeneous areas in a building, he or she must gather information that will tie each area to the uses or functions occurring within it. The management planner will use the information gathered by the inspector to determine functional spaces. Under the AHERA Rule, a functional space is essentially a room, group of rooms, or space in a building that has an identified use. Examples of functional spaces are classrooms, hallways, offices, mechanical rooms, ceiling plenums, tunnels, and crawl spaces.

*(See Example Form 2 at the end of this chapter for an example of how to record information relating each homogeneous area to a functional space.)*

### **Bulk Sampling**

Under the AHERA Rule, all material suspected to be ACM must be assumed to be ACM unless:

The homogeneous area is sampled as required by § 763.86 of the AHERA Rule, and the samples are analyzed as required by § 763.87 of the AHERA Rule and found to be non-asbestos; or

The suspect or assumed ACM is in a building built after October 12, 1988, that is certified by an architect or developer as being asbestos-free.

Where sampling and analysis is performed on suspected ACM, the procedures must be properly documented and the sample's asbestos content must be below the EPA definition of ACM (*See Glossary in Appendices*) in order for any of the suspect material to be treated as asbestos-free.

Section 763.86 of the AHERA Rule sets forth requirements for bulk sampling based on the type of material involved. Table 5-1 shows the number of samples required to be collected from each type of homogeneous area to meet the regulation requirements.

The regulations do not indicate how many samples are required to meet the "in a manner sufficient to determine." However, the EPA policy statement in the document *100 Commonly Asked Questions About the New AHERA Asbestos-in-Schools Rule* recommends that a minimum of three samples be taken from any homogeneous area to prove that a material does not contain asbestos. However, the designation of ACM for a homogeneous area based on one positive bulk sample result is acceptable.

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.

It is recommended that all samples taken always be analyzed, since one sample analysis is rarely representative of a homogeneous area. EPA recommends the use of an improved test method entitled "Method for the Determination of Asbestos in Bulk Building Materials" in place of the 1982 procedures as found in 40 CFR Part 763, Appendix E to Subpart E. Further EPA recommends that LEAs which have Polarized Light Microscopy (PLM) laboratory results indicating floor tiles to be non-asbestos containing may want to retest these materials using this new method. This method should be considered for the following: 1) floor tiles which may contain thin fibers and which were analyzed under the 1982 method and found not to contain asbestos, 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.

*(See Example Form 3 at the end of this chapter for a form that is representative of a bulk sampling log that should appear in your inspection report.)*

### **Exclusions to the AHERA Inspection Requirements**

Under the AHERA Rule, all ACM that are used as interior building materials in a school must be identified by ACBM category so that they may be properly sampled and assessed for appropriate response action. However, identification of ACM at schools is not required for ACM that is not installed (stored on site) or for consumer products at the school (auditorium curtains, electrical wiring stored on-site, fire blankets, etc.). ACM installed outside of the building (such as roofing materials and siding) is also excluded from inspection under AHERA. However, this exemption does not extend to the underside of any portico or covered exterior hallway or walkway or to any exterior portion of a mechanical system.

Section 763.99 of the AHERA Rule also excludes from the inspection requirements any sampling area or homogeneous area of a school building where:

- An accredited inspector has determined that, based on sampling records, friable ACBM was identified in the area during an inspection conducted before December 14, 1987. However, such ACBM must still be physically assessed by the accredited inspector.

- Location and amount of the material
- Condition of the material, specifying:
  - Type of damage or significant damage
  - Severity of damage
  - Extent or spread of damage
- Whether the material is accessible
- Material's potential for disturbance
- Known or suspected causes of damage or significant damage
- Preventive measures that might eliminate the reasonable likelihood of undamaged ACBM from becoming significantly damaged

To determine which of the seven Physical Assessment Categories a material should be placed into, several terms must be defined. The preamble to the AHERA Rule, Federal Register, October 30, 1987, p. 41830, examines the difference between "damaged material" and "significantly damaged" material. According to the preamble, significant damage exists where damage is evenly distributed across 10 percent or more of a functional space or is localized over 25 percent of a functional space.

*(See Example Form 4 at the end of this chapter for a form that may be used to show why ACBM was assigned to a particular category.)*

The preamble goes on to state that material has potential for significant damage, as opposed to only potential for damage, if it is subject to major or continuing disturbance due to factors such as accessibility or, under certain circumstances, vibration or air erosion. If the accredited inspector determines that there is a high or strong likelihood of major disturbance due to accessibility, vibration, or air erosion, there is a potential for significant damage. If the likelihood of any of these factors occurring is moderate, there is only a potential for damage. If the likelihood of any of these factors occurring is low, the inspector should assign Physical Assessment Category No. 7 (any remaining friable ACBM or friable suspected ACBM) to the material.

Because the physical assessment is used to determine which response actions will be chosen to manage the asbestos, proper identification and assessment of ACBM are vital to the effective implementation of the AHERA program. The decision tree that follows can help determine the correct assessment category for material in a functional space (*See the Exercise at the end of this chapter for a brief exercise for determining the correct Physical Assessment Category for a functional space*).

## **The Inspection Report**

The results of an AHERA inspection or reinspection must be documented in an inspection report. All decisions regarding ACBM in the LEA's buildings will be based on the information found in this report, so it is vital that the report information be correct. If materials are incorrectly identified as containing asbestos, the LEA will take on needless expense for preventive measures, while if materials are incorrectly identified as not containing asbestos, the LEA may expose building occupants to increased health risks and itself to legal liability.

### **Contents of the Inspection Report**

Section 763.85 of the AHERA Rule lists the required elements of the inspection report:

#### **General Inspection Information**

- Date of the inspection
- Signature and license #of each accredited person who conducts inspection-related activities
- Ideally, a copy of the accreditation certificate for each accredited person making the inspection; at minimum, the state of accreditation , accreditation number of each accredited person who conducts inspection-related activities and the

#### **Information on Sampling/Assumed ACBM**

- 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 ACBM
- Homogeneous areas where nonfriable suspected ACBM is assumed to be ACBM
- Description of the manner used to determine sampling locations
- Name and signature of each accredited inspector who collected the samples
- State of accreditation of each accredited inspector who collected the samples
- Accreditation number of each accredited inspector who collected the samples, if applicable

#### **Identification and Assessment Information**

- List of whether the homogeneous areas identified in the report are surfacing material, thermal system insulation, or miscellaneous material
- Assessments made of friable material and reasons for these assessments
- Name and signature of each accredited inspector making the assessment
- State of accreditation of each accredited inspector making the assessment
- Accreditation number of each accredited inspector making the assessment, if applicable

**Chapter 5 Summary**  
**Key Points About the AHERA Inspection**

An AHERA inspection must be conducted by an **accredited inspector**.

The inspector must identify all **homogeneous areas** of material that are suspected to contain asbestos. Homogeneous areas contain asbestos that is uniform (alike) in color and texture.

All material suspected to be ACM must be assumed to be ACM unless the homogeneous area is **sampled**, and the analysis of the samples shows them to be non-asbestos. Adequate number of samples must be taken or the area will be considered to be ACM regardless of the results of the analyses.

Once the inspector has identified all ACM in a building, he or she must perform a **physical assessment** of all TSI and friable ACM. This involves categorizing the material into one of seven Physical Assessment Classifications.

The results of an AHERA inspection and the assessment must be documented in an **inspection report**. This report will be used by the management planner to make written recommendations on appropriate response actions.



Example Form 1

Inspection Report: List of Homogeneous Areas

Project Name: \_\_\_\_\_  
Address: \_\_\_\_\_

| Area # | Area Description | Linear or Sq. Ft. | L<br>S | Friable Y/N | Type S/T/M | ACBM Y/N |
|--------|------------------|-------------------|--------|-------------|------------|----------|
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Example Form 3

Bulk Sample Log

School: \_\_\_\_\_ Date Sampled \_\_\_\_\_  
Homogeneous Area \_\_\_\_\_ Sampler's Name \_\_\_\_\_  
Functional Space/Room: \_\_\_\_\_ CT License No. \_\_\_\_\_  
Linear Feet: \_\_\_\_\_ Type of Suspect Material \_\_\_\_\_  
Square Feet: \_\_\_\_\_ Surfacing \_\_\_\_\_ TSI \_\_\_\_\_ Misc. \_\_\_\_\_  
Friable \_\_\_\_\_ Non-friable \_\_\_\_\_  
Manner of Sampling: \_\_\_\_\_  
AREA DESCRIPTION: \_\_\_\_\_

| Number | Location |
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## Inspection Report Compliance Checklist

This checklist is designed to enable you to determine if the inspection report is complete and contains each and every element required by law.

### GENERAL:

- 1. The date of the inspection
- 2. The signature of each accredited person making the inspection
- 3. The State of accreditation of each accredited person making the inspection
- 4. The license number of each accredited person making the inspection

### INVENTORY OF LOCATIONS:

- 5. An inventory of the locations of the homogeneous areas where samples were collected
- 6. The exact location where each bulk sample was collected
- 7. The date(s) that each sample was collected
- 8. The homogeneous areas where friable suspected ACBM is assumed to be ACBM
- 9. The homogeneous areas where nonfriable suspected ACBM is assumed to be ACBM

### SAMPLING:

- 10. A description of the manner used to determine sampling locations
- 11. The name and signature of each accredited inspector who collected the samples
- 12. The State of accreditation of each accredited inspector who collected the samples
- 13. If applicable, the accreditation number of each accredited inspector who collected the samples

### MATERIALS IDENTIFIED IN HOMOGENEOUS AREAS:

- 14. A list of whether the homogeneous areas identified are surfacing material, thermal system insulation, or miscellaneous material

### ASSESSMENTS:

- 15. Assessments made of friable material
- 16. The name and signature of each licensed inspector who made the assessment
- 17. The State of accreditation of each accredited inspector who made the assessment
- 18. The license number of each accredited inspector who made the assessment

- Description of the manner used to determine sampling locations
- Name and signature of each accredited inspector collecting samples
- State of accreditation and license number of each accredited inspector collecting samples (or copies of the accreditation certificates and license)

**Analysis of Samples**

- Copy of the analyses of any bulk samples collected and analyzed
- Name and address of any laboratory that analyzed bulk samples
- Statement that any laboratory used meets the accreditation requirements of §763.87(a) of the AHERA Rule and is a CT approved laboratory
- National Voluntary Laboratory Accreditation Program number (or certificate)
- Dates of any analyses performed
- Name and signature of the person performing each analysis

**Physical Assessment Information**

- Description of the assessments required by § 763.88 of the AHERA Rule of all friable ACBM and suspected ACBM assumed to be ACM.
- Name and signature of each accredited person making the assessments
- State of accreditation and license number of each accredited person making the assessment (or copies of the accreditation certificates and license)

**Response Action Information**

- Recommendations made to the LEA by (an) accredited management planner(s) regarding response actions
- Name and signature of each person making the recommendations
- State of accreditation and license number of each person making the recommendations (or copies of the accreditation certificates)
- Detailed description of preventive measures and response actions to be taken, including methods to be used, for any friable ACBM
- Locations where such measures and actions will be taken
- Reasons for selecting the response action or preventive measure
- Schedule for beginning and completing each preventive measure and response action

**Information on ACBM Remaining after Response Actions**

- A blueprint, diagram, or written description of any ACBM or suspected ACBM assumed to be ACBM that remains in the school once response actions are undertaken. This should be updated as soon as response actions are completed

**Information on Future Activities**

- A plan for reinspection under § 763.85 of the AHERA Rule
- A plan for operations and maintenance (O&M) activities under § 763.91 of the AHERA Rule
- A plan for periodic surveillance under §763.92 of the AHERA Rule
- Description of the management planner recommendations regarding additional cleaning under §763.91(c)(2) of the AHERA Rule as part of an O&M program
- The response of the LEA to any recommendation for additional cleaning

- The name and address of each laboratory performing an analysis.
- The date of the analysis.
- The name and signature of the person performing the analysis. The name and signature requirements apply to the microscopist(s) who actually performed each analysis; it is recommended that the laboratory manager also sign the reports.
- Proof that the laboratory has received NVLAP accreditation. This proof should consist of a copy of the laboratory's NVLAP certificate, not just a statement that the laboratory is accredited. For laboratory reports prepared before the NVLAP program was started, proof of the laboratory's EPA interim accreditation is acceptable but should include the laboratory's EPA laboratory accreditation number.

es Laboratory must have State of Connecticut approval

### Response Actions

In the management plan, the accredited management planner must recommend an appropriate response action (operations and maintenance, repair, encapsulation, enclosure, or removal) for all areas of thermal system insulation (TSI) and friable ACBM. The final decision on which action should be taken, however, rests with the LEA. Under AHERA, the response action to be taken must be "sufficient to protect human health and the environment." Once it is determined which response actions meet these criteria, the LEA may choose the action that is the "least burdensome."

AHERA identifies five possible response actions for managing asbestos in schools:

- **Operations and Maintenance (O&M) Program** -- This is a program of work practices designed to maintain friable ACBM in good condition and ensure cleanup of asbestos fibers previously released. An effective O & M program can prevent further release by minimizing and controlling friable ACBM disturbance or damage. (*See Chapter 8 for a complete description of the O&M Program.*)
- **Repair** -- This involves returning damaged ACBM to an undamaged condition or to an intact state by replacing limited sections or patching damaged areas.
- **Encapsulation** -- This involves the treatment of ACBM with a material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent the release of fibers. The encapsulant either creates a membrane over the surface (bridging encapsulant) or penetrates the material and binds its components together (penetrating encapsulant). Both types of encapsulants are applied to the material surface using airless spray equipment at low pressure to reduce release of fibers during the application.
- **Enclosure** -- This involves creating an airtight, impermeable, permanent barrier around ACBM to prevent the release of asbestos fibers into the air. The barrier is typically attached physically or sprayed on. For example, materials such as PVC or corrugated metal may be fastened around insulated piping, or a barrier may be constructed around

The inspection should be conducted as rigorously as possible, with all spaces and surfaces where the abatement was conducted being extensively examined for residual ACM debris. The inspection may involve:

- Scrutinizing every corner and crevice of the area within the containment barriers used to isolate the functional space for the response action
- Using a ladder to inspect hard-to-physically-reach areas
- Brushing or wiping surfaces to detect dust
- Using a flashlight beam to detect loose debris or airborne residue
- Using a damp cloth to detect dust
- Inspecting permanent fixtures in the area, such as ceiling tile grid bars, pipes, ducts, etc.
- Inspecting for asbestos-laden water, which may have leaked from the enclosure onto floor surfaces beneath the abatement area

- Examining surfaces for water and/or debris markings
- Checking crawl spaces on hands and knees; dirt floors may contain pulverized or impacted asbestos debris

The aim of the visual inspection is to ensure that:

- Seals on windows, doors, and vents remain in place during final air monitoring
- Isolation barriers separating the abatement area from non-abatement areas are in place
- No evidence of residue, debris, or dust is present in the abatement area

The presence of any visible residue on surfaces within the abatement area indicates a need for additional cleaning of the surfaces. If an area passes visual inspection but then fails to meet air sampling and analysis requirements after that inspection, the site must be recleaned and an additional visual inspection be conducted to detect any material that may have been uncovered or released during recleaning. Only after visual inspection clearance has been completed may final air sampling be done.

The results of the visual inspection should always be documented and signed by the person conducting the visual inspection.

### **Final Air Sampling and Analysis**

Section 763.90 of the AHERA Rule requires that the LEA accomplish final air sampling and analysis of all removal, encapsulation, or enclosure projects by using the transmission electron microscopy (TEM) method, unless the project involves no more than 160 square feet or 260 linear feet of ACBM, in which case phase contrast microscopy (PCM) may be used. Note that no final air clearance is required for small-scale, short-duration O&M projects. (*See Appendix B of the AHERA Rule for information on the types of projects that qualify as small-scale, short-duration.*)

Sampling operations for airborne asbestos following an asbestos abatement action must be performed by qualified individuals completely independent of the abatement contractor to avoid possible conflict of interest. EPA recommends that the LEA obtain professional assistance to perform the sampling and analysis.

- The TEM Method

The TEM Method involves the collection of at 13 samples (five samples inside the functional space; five samples representative of air entering the abatement site; and three quality control "blank" samples). The air samples must be collected using "aggressive" methods or artificially disturbing the air in the functional space before and during sampling, as described in Appendix A, Section III(B)(7)(d) of the AHERA Rule. In most cases, only the 5 samples collected inside the functional space will be analyzed. If the average result of the five samples collected inside the functional space is less than 70 structures per square millimeter ( $70 \text{ s/mm}^2$ ), the response action is considered complete.

**Table 6-2**

| <b>Implementation Requirements for Operations<br/>Associated with the Management Plan</b> |  |
|---|--|
| <b>Requests</b>   | <b>Deadline</b>  |
| <b>The Management Plan</b>  | The plan must be kept current with ongoing O & M, periodic surveillance, inspection, reinspection, and response action activities, including updating the locations of ACBM after response actions and O & M activities.   |
| <b>O&amp;M Program</b>  | Must begin immediately upon the identification of any friable ACBM present or assumed to be present in the building.   |
| <b>O&amp;M Training</b>   | In order to work in a building that may contain asbestos, custodial workers and maintenance staff members must have completed the 2-hour training class described in § 763.92(a)(1) within 60 days of employment. Workers must have completed the 14-hour training requirement described in § 763.92(a)(2) to conduct O&M activities which may disturb ACBM. |
| <b>Periodic Surveillance</b>  | Under § 763.92(b)(1) of the AHERA Rule, periodic surveillance must be conducted at least once every 6 months after a management plan is in effect.   |
| <b>Warning Labels</b>   | Must be posted as soon as possible after identification of ACBM in any routine maintenance area.   |
| (cont.)   | In CT- must be bilingual if significant student/employee population requires translation   |



## FREQUENT PROBLEMS WITH MANAGEMENT PLANS

The Asbestos Management Plans (Plan) should be considered "living" document. *Some Plans are left exactly the same as they were when they were created, with no updates whatsoever.* This is particularly true with respect to required records of periodic surveillances, annual notifications, response actions or fiber releases, and for records of the two-hour and sixteen-hour training for school employees and maintenance workers. In fact, the *administrative staff at individual schools are sometimes unaware of the existence of management plans and/or do not know where the school's copy of the plan is kept.*

*Copies of all pertinent certification credentials* for AHERA inspectors, management planners, project designers, workers and supervisors who have participated in any response actions are required to be in the management plan, but *are not always included.* Also *proper documentation of air samplers' and laboratories' accreditations are sometimes missing* from Plans.

*Homogeneous areas are often not clearly (and frequently are not properly) defined* on the basis of color, texture, size. Plaster and sheetrock are probably the most often overlooked materials which are likely to comprise major areas of suspected asbestos-containing building materials (ACBM). *Sampling locations within the individual homogenous areas are often not described precisely* enough to provide for any relocation of individual original sampling sites with any degree of certainty.

Frequently *insufficient numbers of samples are collected from individual homogeneous areas* (the correct minimum number being dependent upon the type of building material and the homogeneous area size), and the sites for the sampling which was done may have been selected in a manner other than as is set forth in the management plan for how sampling locations were to have been determined. Also, where *warning signs* are required, they may be *missing*, or if present, they may not employ the prescribed text.

Sometimes *functional areas are not taken into consideration in the preparation of assessment and response actions recommendations.* Also recommended response actions may not have been carried out according to schedules shown in the management plans and explanations or changes in the schedules may be absent.

*Portable buildings on school grounds are sometimes overlooked* in management plans, or these units may have been moved onto or off of a school's grounds without the school's management plan having been updated.

**Table 6-4: Management Plan Compliance Checklist**

This checklist is designed to enable you to determine if a management plan contains each and every element required by law. This checklist is for management plans created for inspections completed on or after December 14, 1987. Unless otherwise noted, all statutory references are to the AHERA Rule.

**GENERAL INFORMATION**

- 1. List of the name and address of each school building
- 2. Whether the school building contains friable ACBM, nonfriable ACBM, and friable and nonfriable ACBM assumed to be ACBM

**DESIGNATED PERSON INFORMATION**

- 3. The name, address, and telephone number of the designated person
- 4. The course name, dates, and hours of training taken by the designated person to carry out his or her duties
- 5. Signed statement by the AHERA designated person that the LEA responsibilities under AHERA Rule has been or will be met

**INSPECTOR INFORMATION**

- 6. The date of inspection or reinspection
- 7. The name and signature of each accredited person making the inspection or reinspection
- 8. The State, accreditation number, and name of training provider for each accredited inspector making the inspection or reinspection (copy of certificate is ideal)

**SAMPLING INFORMATION**

- 9. 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
- 10. The exact location where each bulk sample was collected
- 11. The date of collection of each bulk sample
- 12. The homogeneous areas where friable suspected ACBM is assumed to be ACBM
- 13. The homogeneous areas where nonfriable suspected ACBM is assumed to be ACBM
- 14. A description of how sampling locations were determined
- 15. The name and signature of each accredited inspector who collected the samples
- 16. State, accreditation number and name of training provider of each accredited inspector who collected the samples (copy of accreditation certificate is ideal)

**Management Plan Compliance Checklist (cont.)**

- 34. A plan for operations and maintenance (O&M) activities under §763.91
- 35. A plan for periodic surveillance and copies of the reports (see § 763.92)
- 36. A description of the management planner recommendations regarding additional cleaning under § 763.91(c)(2) as part of an O&M program and documentation of cleaning
- 37. A description of steps taken to inform workers and building occupants about inspections, reinspections, response actions, and post-response actions, including periodic surveillance
- 38. An evaluation of the resources needed to complete response actions and carry out reinspection, O&M activities, periodic surveillance and training
- 39. The name of each consultant who contributed to the management plan
- 40. With respect to each consultant who contributed to the management plan, a copy of the accreditation certificate (or name of training provider, State and accreditation number)
- 41. The response of the LEA to any recommendation for additional cleaning

**Checklist of Final Air Clearance Documentation**

This checklist will indicate whether each final clearance was properly documented.

- 1. The name and signature of any person collecting any air sample required to be collected at the completion of a response action
- 2. The locations where those samples were collected
- 3. The name and address of the laboratory, analyzing the samples
- 4. The date(s) of analysis
- 5. The results of analysis
- 6. The method of analysis
- 7. The name and signature of the person performing the analysis
- 8. Evidence that the laboratory is NVLAP accredited

- Record and submit the following information for inclusion in the management plan to the LEA designated person within 30 days of the reinspection:
  - Date of the reinspection
  - Name and signature of the person conducting the reinspection
  - State, license number, and training provider name for any person conducting the reinspection (copy of certificate is ideal)
  - Exact locations where samples were collected during the reinspection
  - Description of the manner used to determine sampling locations
  - Name and signature of each licensed inspector who collected the samples
  - State, license number, and training provider name for each inspector who collected the samples (copy of certificate is ideal)
  - Any assessments or reassessments made of friable material
  - Name and signature of the accredited inspector making the assessments
  - State, license number and training provider name for each inspector making the assessments (copy of certificate is ideal)

### **Management Planner Responsibilities**

Once a reinspection is completed, the management planner must:

- Review the results of the reinspection. This includes reviewing the original inspection report, periodic surveillance records, and the completed reinspection forms and report. The management planner should conduct school visits and gather other information so that he or she can make effective response action recommendations.
- Make written response action and preventive measure recommendations for each area of friable surfacing and miscellaneous ACBM and each area of TSI ACBM. The management planner should determine whether additional cleaning is necessary and, if so, specify how, when, and where to perform cleaning. The management planner should also include an implementation schedule for the recommended activities and make an estimate regarding the resources (cost, personnel, equipment, etc.) needed to conduct the activities.
- Review the adequacy of the Operations & Maintenance Program.
- The recommendations should include a record of the name, signature, State, license number and training provider name for the management planner (copy of license is ideal) and the date on which the management planner submitted the recommendations.

For further information on reinspection requirements, review *A Guide to Performing Reinspections Under the Asbestos Hazard Emergency Response Act (AHERA)* (March 1992).

**Chapter 7 Summary**  
**Key Points About Reinspections and Periodic Surveillance**

As long as any ACBM remains in a school building, the building must be **reinspected** at least once every three years.

The reinspection and assessments/reassessments must be conducted by an **accredited inspector**. The results of the inspection must be submitted to the Designated Person within 30 days to include into the management plan.

The **management planner** must:

- 1) review the results of the reinspection,
- 2) make written response action and preventive measure recommendations for each area of friable surfacing and miscellaneous ACBM and each area of TSI ACBM,
- 3) determine whether additional cleaning is necessary and, if so, specify how, when, and where to perform cleaning,
- 4) include an implementation schedule for the recommended activities and make an estimate regarding the resources needed to conduct the activities, and
- 5) review the adequacy of the Operations & Maintenance Program.

At least once every six months after a management plan is in effect, the LEA must conduct **periodic surveillance** in each building that contains ACBM or is assumed to contain ACBM.

Limited encapsulation and enclosure could be used to enhance an O&M program by reducing the likelihood of contact with the ACBM, however.

### **Required Elements of An O&M Program**

Under § 763.91 of the AHERA Rule, the LEA must ensure that the O&M program involve the following elements:

- Cleaning
- Specialized work practices and procedures for O&M activities disturbing friable ACBM
- Training
- Emergency Response Procedures

#### **Cleaning**

All areas of a building where friable ACBM and suspected ACBM, or significantly damaged TSI ACBM is present must be cleaned at least once after the completion of the AHERA inspection. It must also be cleaned before the initiation of any response action (other than O&M activities or repair). The exception would be where the building had been cleaned using similar methods within the previous six months. The cleaning must include the following:

- HEPA-vacuuming or steam-cleaning all carpets
- HEPA-vacuuming or wet-cleaning all other floors and all other horizontal surfaces
- Disposing of all debris, filters, mopheads, and cloths in sealed, leak-tight containers

The management planner may also recommend that additional cleaning be performed. The methods and frequency of any additional recommended cleaning should be included in the management plan.

#### **Specialized Work Practices and Procedures**

The LEA must ensure that the following procedures are followed for any O&M activities disturbing friable ACBM:

- Restrict entry into the area by persons other than those necessary to perform the maintenance project.
- Post signs to prevent entry by unauthorized persons.
- Shut off or temporarily modify the air-handling system and restrict other sources of air movement.

as possible. (See Chapter 9 on training requirements.) Note, however, that local regulations may be more stringent than the AHERA requirements.

### **Major Fiber Release Episode**

A major fiber release episode consists of the falling or dislodging of more than three square or linear feet of friable ACBM. Section 763.91(f)(2) of the AHERA Rule requires that when such an episode occurs, the LEA must ensure that:

- Entry into the area is restricted and signs posted to prevent entry into the area by persons other than those necessary to perform the response action.
- The air-handling system is shut off or temporarily modified to prevent the distribution of fibers to other areas in the building.
- The response action for any major fiber release episode is designed by persons accredited to design response actions and conducted by persons accredited to conduct response actions.

After a response action is implemented to manage a major fiber release episode, the final air clearance requirements of AHERA must be met before the response action is considered complete. (See Chapter 6 on the final air clearance requirements.)

**Major and minor fiber-release episodes must be documented and included in the management plan regardless of whether the LEA uses in-house staff or an outside asbestos abatement contractor to implement an appropriate response action.** If an outside contractor is used, be sure that the contractor's crew has been properly trained or certified before signing a contract.

*(See the Fiber Release Episode Report at the end of this chapter.)*

### **Other Elements of an O&M Program**

In addition to the elements required by § 763.91 of the AHERA Rule, other elements are either recommended or required by the rule or related regulations. These include:

- Notification
- Labeling
- Employee Protection and Medical Surveillance
- Maintenance and Renovation Permit System
- Special Work Practices for Maintenance Activities
- Special Work Practices for Renovation/Remodeling

Unlike notification, labeling is not intended as a way to disseminate general information. Instead, it is a last line of defense to prevent unprotected individuals from unknowingly disturbing ACBM. The State of Connecticut requires bilingual signs when a significant population of students and/or employees necessitate translation.

### **Employee Protection & Medical Surveillance Programs**

The OSHA Asbestos Standard for the Construction Industry and the EPA Worker Protection Rule explain when employees are required to wear a negative-pressure respirator and must be involved in a medical surveillance program (see also OSHA Asbestos Standard for General Industry). The purpose of a medical surveillance program is to determine whether or not an employee is healthy enough to wear a respirator and to detect any health changes in an employee's body resulting from working in asbestos-contaminated areas. Changes in health may indicate the onset of an asbestos-related disease.

In addition, any employee who works in an environment where fiber levels are at the permissible exposure limit or higher or who wears a negative-pressure respirator as part of his or her job must participate in a respiratory protection program. The only way to determine whether these fiber levels exist is to collect air samples during projects that disturb ACBM. In an O&M program, the use of negative-pressure respirators will make it necessary for most custodial and maintenance workers to participate in both the medical surveillance program and the respiratory protection program. Even if fiber levels are below the permissible exposure limit described above, it is strongly suggested that an LEA establish these programs and require that employees wear respirators any time they are likely to disturb ACBM.

### **Maintenance & Renovation Permit System**

One of the most difficult tasks that the LEA designated person faces is minimizing accidental disturbances of ACBM during maintenance and renovation operations. One way that a designated person can control such disturbances is by establishing a permit system where all work orders or requests are processed through the designated person.

In a permit system, all requests for maintenance or renovation activities are given to the designated person before a work order to proceed is issued. The designated person then checks the management plan for information about the presence of ACBM where work is to be performed and physically inspects the area in question to make sure that the records reflect actual conditions. If no asbestos is present, the designated person can sign and issue the work order. If ACBM is present, the designated person can sign the work order and then either ensure that trained maintenance or renovation workers are properly equipped to handle the ACBM or dispatch an "emergency response" team to remove the ACBM. In situations where there are large amounts of ACBM, maintenance or renovation work that does not have to be done immediately should be postponed until the ACBM in the area can be removed by a licensed contractor. The permit system should be in place for all facility



For a discussion of the work practices needed where an accidental disturbance of ACBM is possible, see the Green Book.

- **Disturbance of ACBM Intended or Likely** -- Some maintenance and repair activities will make ACBM disturbance almost unavoidable. Installing new sprinkler or piping systems will make it necessary to hang pipes from structural members or from the ceiling, and if the beams or ceilings are insulated with ACBM, the ACBM will be scraped away to install hangers. Similarly, pulling cables or wires through spaces with ACBM or ACBM debris is likely to dislodge pieces of the ACBM or disturb ACBM debris and dust. Any time ceiling tiles are moved to allow for entry into the space above a suspended ceiling, settled dust on top of the tiles will be recirculated into the air. If the beams or decking above the ceiling are covered with ACBM, the dust is likely to contain asbestos fibers.

A designated person should not allow such intentional disturbances of ACBM to proceed in an uncontrolled manner. The designated person should ensure that the elements required under § 763.91 of the AHERA Rule to be part of an O&M program are implemented effectively and that the regulatory requirements of the EPA Worker Protection Rule and the OSHA Asbestos Standard for the Construction Industry are followed.

- **A Large Amount of ACBM Will be Disturbed** -- If the maintenance work is part of general building renovation, federal regulations may require that ACBM be removed before the project begins. Even if smaller amounts of ACBM are to be disturbed, building owners should consider removing all ACBM from the area of the building where the maintenance work is planned. Typically, an outside abatement contractor would be hired for the removal project before the maintenance work begins. If the LEA decides to use its own staff to remove the ACBM, these workers must be fully trained and accredited in asbestos abatement. (*See Chapter 9 for information on the training and accreditation requirements for asbestos abatement.*)

### **Maintenance of Vinyl Asbestos Tile**

(Revised from a "Guidelines for the Maintenance of Asbestos-Containing Floor Coverings" developed by Rhode Island Department of Health and the Environmental Protection Agency, New England)

Vinyl Asbestos Tile (VAT) is the most prevalent source of asbestos containing material in our schools and most likely will be for years to come. Although VAT is considered non-friable, the frictional forces exerted on these materials during routine floor-care maintenance operations can release asbestos fibers.

The principle types of floor covering maintenance performed routinely on resilient floor tiles include:

## Finishing of Vinyl Asbestos Floor Coverings

### *Use of Sealer and Solids Finish*

Prior to applying a finish coat to a vinyl asbestos floor covering, apply 2 to 3 coats of sealer. Continue to finish the floor with a high percentage solids finish.

It is an industry recommendation to apply several thin coats of a high percentage solid finish to obtain a good sealing of the floor's surface, thereby minimizing the release of asbestos fibers during finishing work.

### *Spray-Buffering Floors*

When spray-buffering floors, always operate the floor machine at the lowest rates of speed possible and equip the floor machine with the least abrasive pad as possible. A recent EPA study indicated that spray-buffering with high-speed floor machines resulted in significantly higher airborne asbestos fiber concentrations than spray-buffering with low speed machines.

### *Burnishing Floors*

When dry-burnishing floors, always operate the floor machine at the lowest rate of speed possible to accomplish the task (i.e., 1200-1750 rpms), and equip the floor machine with the least abrasive pad as possible.

### *Cleaning After Stripping & Sealing Floors*

After stripping a floor and applying a new coat of sealer and finish, use a wet mop for routine cleaning whenever possible. When dry mopping, a petroleum-based mop treatment is not recommended for use.

## Maintenance During Winter

During the winter months when sanding and/or salting of icy parking lots becomes necessary, it is an industry recommendation that matting be used at the entrance way to the school building and inside the doorway where feasible. This would significantly eliminate the scuffing of floors by abrasive sanding materials brought into the building on the shoes of building occupants. More frequent wet mopping and dry mopping of floors should be performed during the winter months to minimize damage to the floors.

The same recommendations holds true of schools located on coastal areas where building occupants could track sand into the schools.

## Additional Precautions

### *Conditions of Glides*

Check to see if chair and desk glides are in good condition and replace where indicated. Worn glides can gouge the floor coverings and possibly cause asbestos fiber release.

### **Handling and Disposing of Asbestos Wastes**

The amount and type of asbestos present both determine whether the LEA must notify EPA (or delegated states) and what procedures that the LEA must follow to control asbestos emissions. If the amount exceeds the regulatory threshold, then a written notification must be submitted ten working days prior to any asbestos stripping or removal operation or demolition operation. EPA regulations (along with state and local requirements) provide detailed instructions on the handling, transport, and disposal of asbestos materials. This includes emission control methods (such as wetting and leak proof wrapping), labels on the containers, recordkeeping and a trained representative on-site. Waste must be disposed of at a site meeting federal, state and local requirements. For a site in your area, contact the local public health department.

**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)

# 9

## TRAINING AND ACCREDITATION

### Introduction

AHERA requires that LEAs employ accredited persons to perform most of the activities associated with asbestos management. Building inspectors, management planners, project designers, contractors/supervisors, and asbestos workers must all complete EPA- or State-approved courses that result in accreditation. These disciplines are also required to be licensed in CT. The specific training requirements for each of these categories of workers are outlined in Appendix C to the AHERA Rule (the AHERA Model Accreditation Plan). The AHERA Rule also details specific training requirements for LEA designated persons and maintenance and custodial workers, although these individuals are not required to complete any EPA-approved courses or receive accreditation.

### Designated Person Training

AHERA requires that the AHERA Designated Person be *adequately* trained to carry out his or her responsibilities. Due to the differing needs of school districts based on the size of the district and the amount and condition of the ACBM, AHERA does not list a specific training course or specific number of hours of training for the DP. Further, AHERA does not require the DP to be accredited. Specifically, the regulations note the training must include the following topics:

- health effects of asbestos;
- detection, identification and assessment of asbestos-containing building materials;
- options for controlling asbestos-containing building materials; and
- asbestos management programs.
- Relevant Federal and State regulations concerning asbestos, including AHERA and its implementing regulations and the regulations of the Occupational Safety and Health Administration, the U.S. Department of Transportation, and the U.S. Environmental Protection Agency (*See Chapter 11 for further information on regulations related to AHERA.*)

The training completed by the designated person must be documented by course name, dates, and hours of training. This documentation must be kept as a permanent part of the management plan.

To determine whether reviewing this document would satisfy the training requirements for the DP, school personnel should consult with the regional asbestos coordinator in the EPA Regional Office serving their state.

**Building Inspectors** -- Building inspectors must complete a minimum of three days (24 hours) of training. Training course information covers technical information needed to identify and describe ACBM and information needed to write an inspection report.

**Management Planners** -- Management planners must complete a two-day (16 hours) course after they have completed and passed the exam for the building inspector training described above. This course is an extension of the building inspector training and teaches how to develop a schedule (or plan) for implementation of response actions for hazards or potential hazards identified in the inspection report, how to develop an O&M plan, and how to prepare and update a management plan.

**Project Designers** -- Project designers must complete a three-day (24 hours) abatement project designer training course. The project designer course teaches how to design response actions and abatement projects. It also covers basic concepts of architectural design, engineering controls and proper work practices as required by the regulation.

**Contractors/Supervisors** -- Contractors/supervisors must complete a minimum of five days (40 hours) of training. The course teaches proper work practices and procedures and covers contractor issues such as legal liability, contract specifications, insurance and bonding, and air monitoring. The course fulfills the OSHA "competent person" training requirement and the NESHAP "trained representative" requirement.

**Asbestos Workers** -- An asbestos worker must complete a minimum of four days (32 hours) of training. The course covers work practices and procedures, personal protective equipment, health effects of asbestos exposure, and other information critical to individuals who work in an abatement area with hazardous materials.

### **Update Training**

All project designers, contractors/supervisor, and asbestos workers must complete a one day annual refresher training course for reaccreditation. Building inspectors must complete a half-day refresher course. Management planners must attend the half-day building inspector refresher course as well as a half-day management planner refresher course. Documentation of any annual training should be kept in the management plan.

Although not specifically required by the AHERA Rule, annual refresher/update training for maintenance workers is recommended. OSHA requires annual training.

**Table 9-2**

| <b>Accredited Personnel Training Requirements</b> |   |                                  |                                      |
|---|---|----------------------------------|--------------------------------------|
| <b>Job Title</b>                                  | <b>Subject Matter of Training</b>   | <b>Amount of Training (Days)</b> | <b>Annual Training Update (Days)</b> |
| <b>Building Inspectors</b>                        | Technical information needed to identify and describe ACBM; information needed to write an inspection report  | 3                                | ½                                    |
| <b>Management Planners</b>                        | Extension of the building inspector training, plus how to develop a schedule (or plan) for implementation of response actions for hazards or potential hazards identified in the inspection report, how to develop an O&M plan, and how to prepare a management plan. | 2 a                              | ½ b                                  |
| <b>Project Designers</b>                          | How to design response actions and abatement projects; basic concepts of architectural design, engineering controls and proper work practices   | 3                                | 1                                    |
| <b>Contractors/ Supervisors</b>                   | Proper work practices and procedures; contractor issues such as legal liability, contract specifications, insurance, and bonding; air monitoring  | 5                                | 1                                    |
| <b>Asbestos Workers</b>                           | Work practices and procedures, personal protective equipment, health effects of asbestos exposure, and other critical information   | 4                                | 1                                    |

<sup>a</sup> Management planners must first complete the building inspector training and pass the exam.

<sup>b</sup> This includes the one-half day building inspector training update.

# 10

## RECORD-KEEPING

### **Recordkeeping of Management Plans**

Under § 763.93(g) of the AHERA Rule, each LEA is required to keep in its administrative office a copy of the management plans for each school. *(See Table 6-1 for a comprehensive list of the required contents of the management plan.)* The management plan must be available, without cost or restriction, for inspection by the public, including teachers, other school personnel and their representatives, and parents, as well as by representatives of EPA and the State.

In addition, each school is required to maintain in its administrative office a complete and updated copy of the management plan for that school. The school must make the plan available for inspection to those individuals listed above as well as to workers before work begins in any area of a school building.

It is the responsibility of the LEA designated person to ensure that complete and up-to-date records are maintained and included in the management plan. Section 763.94 of the AHERA Rule requires that the LEA maintain the following records *(Note that some of these requirements have been listed in other portions of this guide).*

### **Training Information**

For each person required to be trained under §§ 763.92(a)(1) and (2) of the AHERA Rule (maintenance and custodial worker training), the LEA must provide:

- The person's name and job title
- The date that training was completed
- The location of the training
- The number of hours completed in the training

### **Periodic Surveillance Information**

Each time that periodic surveillance is conducted under § 763.92(b) of the AHERA Rule, the LEA must record:

- The name of each person conducting the surveillance
- The date of the surveillance
- Any changes in the conditions of the materials being examined



For each preventive measure and response action taken for friable and nonfriable ACBM and friable and nonfriable suspected ACBM assumed to be ACBM, the LEA must provide:

- A detailed written description of the measure or action, including the method used
- The location where the measure or action was taken
- Reasons for selecting the measure or action
- The start and completion dates of the work
- If applicable, the names and addresses of all contractors involved with the work
- If applicable, the State, accreditation number, and training provider name of all contractors involved with the work (a copy of the certificate)
- If ACBM is removed, the name and location of the ACBM storage or disposal site

### **Air Sampling Information**

In addition to the information required to be provided for each preventive measure and response action taken for friable and nonfriable ACBM and friable and nonfriable suspected ACBM assumed to be ACBM (*See above*), when air sampling is performed for final air clearance of response actions, the LEA must provide:

- The name and signature of any person collecting any air sample required to be collected at the completion of a response action
- The locations where samples were collected
- The date(s) of collection
- The name and address of the laboratory analyzing the samples
- The date(s) of analysis
- The results of the analysis
- The method of analysis
- The name and signature of the person performing the analysis
- A statement that the laboratory is NVLAP accredited or EPA approved

# 11

## RELATED REGULATIONS

### Introduction

Although AHERA and its implementing regulations, the AHERA Rule, set out many of the responsibilities of the LEA, there are several other federal regulations that the LEA should be aware of when implementing an asbestos management program. These regulations include:

- Standards for Asbestos Abatement (CT Section 19a-332a-1 through 19a-332a-16)
- Licensure and Training for Persons Engaged in Asbestos Abatement and Consultation Services (CT Section 20-440-1 through 20-440-9 and 20-441)
- Asbestos in Schools (CT Section 19a-333-1 through 19a-333-13)
- National Emission Standards for Hazardous Air Pollutants (NESHAP)
- Occupational Safety and Health Administration (OSHA) Construction Industry Standard (29 CFR 1926.1101) and General Industry Standard (29 CFR 1910.1001)
- The EPA Worker Protection Rule (40 CFR § 763.121)
- Department of Transportation (DOT) regulations governing the transport and disposal of asbestos-containing materials (49 CFR Parts 171 and 172)

Each of these regulations is discussed in greater detail below. By following the requirements of these related regulations, the LEA can protect not only the people in its buildings from negative health effects but also may protect itself from legal liability. These regulations should be considered to establish minimum standards; going beyond these requirements may help keep buildings as safe as possible. For further information about these related regulations, call the Asbestos Ombudsman Clearinghouse Hotline at (800) 368-5888 between 8:00 a.m. and 4:30 p.m., Eastern.

### National Emission Standards for Hazardous Air Pollutants

The LEA (school district) must comply with the National Emission Standards for Hazardous Air Pollutants for Asbestos (NESHAP) regulations when removing asbestos materials. These regulations specify control requirements for most asbestos emissions, and include work practices to be followed to minimize the release of asbestos fibers during the handling, removal and disposal of asbestos waste materials. NESHAP regulations are frequently enforced by the State or Local Agencies.

A significant term, which is used through NESHAP, is Regulated Asbestos-Containing Materials (RACM). RACM is where the amount of friable asbestos-containing material equals or exceeds the threshold amount of 260 linear feet, 160 square feet, or 35 cubic feet.

exclude federal, state, or local government employees (including public school employees) from its worker protection rules (except in states with OSHA approved programs). However, EPA has promulgated Worker Protection Rules to cover these employees (see below). These standards include required work practices, engineering controls, permissible exposure limits, written programs for respiratory protection and medical surveillance, methods for compliance, hazard communication, housekeeping, competent person training and responsibilities, and required recordkeeping. Also included are demolition, removal, alteration, repair, maintenance (such as custodial workers who clean vinyl asbestos tile floors), installation, clean-up of spills, transportation, disposal and storage of asbestos.

OSHA revised its standards on August 10, 1994. Significant changes to the standards included the following:

- PEL decrease to 0.1 f/cc; action level deleted;
- Asbestos Containing Material defined as material containing more than 1% asbestos (now consistent with EPA);
- Building owners are now covered and have specific duties to identify building materials and notify/communicate with others;
- All asbestos work, regardless of exposure levels, requires at least basic controls and work practices, and exposure monitoring;
- Construction work is classified according to friability of the asbestos and hazardousness of the operation. Increasingly friable and hazardous operations require increasingly stringent engineering controls, work practices, protective equipment, training and monitoring; and
- Training requirements changed to correspond to EPA training.

Two programs are of particular importance to the LEA. OSHA requires establishment of a respiratory protection program (29 CFR § 1910.134) that is designed to protect persons, including the designated person and any employees, who do any work with ACM. The program requires that such persons be equipped with a respirator that provides adequate protection against asbestos. Further, the program must include written standard operating procedures governing the selection and use of respirators, selection of respirators based on the hazards to which workers are exposed, an instruction and training program in the proper use of respirators and its limitations, and requirements for the cleaning, disinfecting, inspecting, and storing of respirators. The written program must be on the job site when asbestos work is being conducted. *(See Chapter 8 under the heading "Employee Protection & Medical Surveillance Programs" for a further discussion of this program.)*

*(See the Model Respiratory Protection Program Checklist at the end of this chapter.)*

The second program is the medical surveillance program, which requires that every person who is assigned to work using a respirator must first have a medical examination to

**Chapter 11 Summary**  
**Key Points About Related Regulations**

An asbestos management program is subject not only to AHERA and the AHERA Rule, but also may be subject to **NESHAP, OSHA, and DOT** regulations, and the **EPA Worker Protection Rule**.

Relevant provisions of NESHAP establish **work practices for asbestos air emission control** when a facility is being demolished or renovated, and for the disposal of **asbestos-containing waste material**.

The OSHA established **minimum standards for the protection of workers involved in asbestos-related work or employees exposed to asbestos-contaminated workplaces**. These standards include required work practices, engineering controls, permissible exposure limits, written programs for respiratory protection and medical surveillance, methods for compliance, hazard communication, housekeeping, competent person training and responsibilities, and required recordkeeping. OSHA excludes federal, state, or local government employees from its worker protection rules (including public school employees).

The EPA Worker Protection Rule **extends the protection afforded by OSHA** to all employees in asbestos abatement who may have been excluded from protection by OSHA.

Relevant provisions of DOT regulations establish **labeling, packaging and shipping standards** for the transporting of asbestos-containing materials.

- 10. Surveillance of work area conditions and degree of employee exposure (e.g., through air monitoring)
- 11. Regular inspection and evaluation of the continued effectiveness of the program
- 12. Recognition and resolution of special problems as they affect respirator use (e.g., facial hair, eye glasses, etc.)
- 13. Proper respirator use (e.g., procedures for putting on and taking off respirators when entering and exiting the abatement area)

# Glossary

***Air erosion:*** the passage of air over friable ACM which may result in the release of asbestos fibers.

***Asbestos:*** the asbestiform varieties of chrysotile (serpentine); crocidolite (riebeckite); amosite (cummingtonite/grunerite); anthophyllite; tremolite; and actinolite.

***Asbestos-containing material (ACM):*** any material or product which contains more than 1 percent asbestos.

***Asbestos-containing building material (ACBM):*** 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:*** pieces of ACM 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:*** 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:*** 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:*** 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, water-stained, 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:*** 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:*** an airtight, impermeable, permanent barrier around ACBM to prevent the release of asbestos fibers into the air.

**Local education agency:**

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

**Major fiber release episode:** 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.

**Management Plan:** a site-specific guidance document that the LEA designated person must follow in managing the ACBM present in a school building.

**Minor fiber release episode:** 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.

**Miscellaneous ACM:** other, mostly nonfriable ACM, products and materials (found on structural components, structural members or fixtures) such as floor tile, ceiling tile, construction mastic for floor and ceiling materials, sheet flooring, fire doors, asbestos cement pipe and board, wallboard, acoustical wall tile, and vibration damping cloth.  
miscellaneous material that is ACM in a school building.

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

**Nonfriable:** material in a school building which when dry may not be crumbled, pulverized, or reduced to powder by hand pressure.

**Operations and maintenance program:** 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:** circumstances in which:

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

**Potential significant damage:** circumstances in which:

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

**Small-scale, short-duration activities (SSSD):** 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.

SSSD can be further defined by the following considerations:

- (1) Removal of small quantities of 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 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.

**Surfacing ACM:** interior ACM that has been sprayed on, troweled on, or otherwise applied to surfaces (structural members, walls, ceilings, etc.) for acoustical, decorative, fireproofing, or other purposes. surfacing material that is ACM.

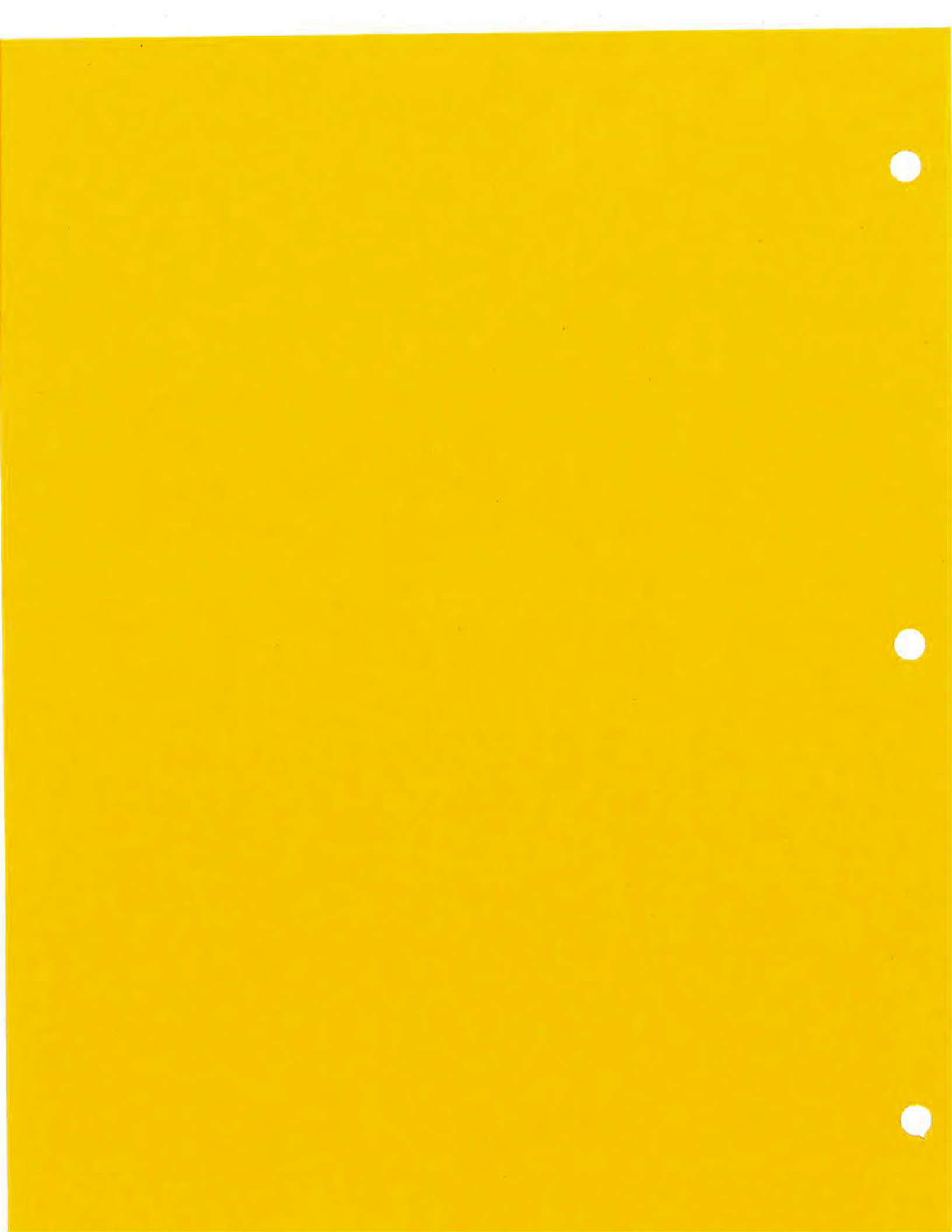
**Surfacing material:** material in a school building that is sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

**Thermal system insulation:** 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:** insulation used to control heat transfer or prevent condensation on pipes and pipe fittings, boilers, breeching, tanks, ducts, and other parts of hot and cold water systems; heating, ventilation, and air-conditioning (HVAC) systems; or other mechanical systems that is ACM.

**Vibration:** the periodic motion of friable ACBM which may result in the release of asbestos fibers.





**School Administrative Unit No. 28 - Pelham School District  
Pelham High School  
85 Marsh Road  
Pelham, New Hampshire**

| <b>Room No.</b>                   | <b>ACM Description</b>      | <b>EPA Category</b> | <b>Approximate Quantity</b> | <b>EPA Assessment</b> | <b>Resp. Action</b> | <b>6-Month Inspect. Changes*<br/>Y/N</b> |
|-----------------------------------|-----------------------------|---------------------|-----------------------------|-----------------------|---------------------|--|
| Maintenance Garage                | Generator Exhaust           | TSI                 | 15 LF                       | 7                     | 1                   |  |
| Kitchen                           | Linoleum                    | Misc.               | 400 ft <sup>2</sup>         | 5                     | 1                   |  |
| Cafeteria                         | Brown Floor Tile and Mastic | Misc.               | 3,500 ft <sup>2</sup>       | 5                     | 1                   |  |
| Room 2                            | White Floor Tile and Mastic | Misc.               | 1,730 ft <sup>2</sup>       | 5                     | 1                   |  |
| Rooms 3 & 4                       | Brown Floor Tile and Mastic | Misc.               | 2,240 ft <sup>2</sup>       | 5                     | 1                   |  |
| Room 5                            | Brown Floor Tile and Mastic | Misc.               | 800 ft <sup>2</sup>         | 5                     | 1                   |  |
| Room 6                            | Brown Floor Tile and Mastic | Misc.               | 960 ft <sup>2</sup>         | 5                     | 1                   |  |
| SPED & Misc. Rooms by Rooms 6 & 7 | Brown Floor Tile and Mastic | Misc.               | 660 ft <sup>2</sup>         | 5                     | 1                   |  |

Notes: ft<sup>2</sup> = Square feet, LF=Linear Feet, If yes, note any changes for 6-Month re-inspection

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6-Month Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

**School Administrative Unit No. 28 - Pelham School District  
Pelham High School  
85 Marsh Road  
Pelham, New Hampshire**

| <b>Room No.</b>   | <b>ACM Description</b>                  | <b>EPA Category</b> | <b>Approximate Quantity</b> | <b>EPA Assessment</b> | <b>Resp. Action</b> | <b>6-Month Inspect. Changes* Y/N</b> |
|-------------------|---|---------------------|-----------------------------|-----------------------|---------------------|--------------------------------------|
| Guidance          | Brown Floor Tile and Mastic             | Misc.               | 1,300 ft <sup>2</sup>       | 5                     | 1                   |                                      |
| Nurse             | Brown Floor Tile and Mastic             | Misc.               | 150 ft <sup>2</sup>         | 5                     | 1                   |                                      |
| Main Office       | Brown Floor Tile and Mastic             | Misc.               | 125 ft <sup>2</sup>         | 5                     | 1                   |                                      |
| Room 8            | Brown Floor Tile and Mastic             | Misc.               | 700 ft <sup>2</sup>         | 5                     | 1                   |                                      |
| Teachers Wok Room | Brown Floor Tile and Mastic             | Misc.               | 1,520 ft <sup>2</sup>       | 5                     | 1                   |                                      |
| Corridors         | Brown Floor Tile and Mastic             | Misc.               | 1,900 ft <sup>2</sup>       | 5                     | 1                   |                                      |
| Room 22 Science   | Asbestos-cement Board<br>Fume Hoods (2) | Misc.               | 30 ft <sup>2</sup>          | 5                     | 1                   |                                      |

Notes: ft<sup>2</sup> = Square feet, LF=Linear Feet, If yes, note any changes for 6-Month re-inspection

6-Month Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

**School Administrative Unit No. 28 - Pelham School District  
Pelham High School  
85 Marsh Road  
Pelham, New Hampshire**

| Room No.                              | ACM Description             | EPA Category | Approximate Quantity  | EPA Assessment | Resp. Action | 6-Month Inspect. Changes*<br>Y/N |
|---------------------------------------|-----------------------------|--------------|-----------------------|----------------|--------------|----------------------------------|
| Second Floor, Work Room<br>By Room 34 | Brown Floor Tile and Mastic | Misc.        | 160 ft <sup>2</sup>   | 5              | 1            |                                  |
| Room 33                               | Brown Floor Tile and Mastic | Misc.        | 1,200 ft <sup>2</sup> | 5              | 1            |                                  |

Notes: ft<sup>2</sup> = Square feet, LF=Linear Feet, If yes, note any changes for 6-Month re-inspection

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6-Month Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

**School Administrative Unit No. 28 - Pelham School District  
Pelham High School  
85 Marsh Road  
Pelham, New Hampshire**

The EPA Assessment Codes identified in the Table above are as follows:

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

The Response Action Codes identified in the Table above are as follows:

1. Monitor identified material under the Operations and Maintenance Program.
2. Repair, encapsulate or enclose identified material, decontaminate immediate area, then monitor under the Operations and Maintenance Program.
3. Remove identified material, decontaminate immediate area. Remove material from Table above.

**SECTION 15**

**SAU #28 - PELHAM HIGH SCHOOL**

**AHERA TRIENNIAL REINSPECTION REPORTS/FORMS**

### S.A.U. 28: 3-Year AIR/ERA Reinspection

| Location                   | ACBM                      | Approximate Quantity | Category | Friable | Condition    | Assessment | Response | Notes  |
|----------------------------|---------------------------|----------------------|----------|---------|--------------|------------|----------|--|
| <b>PELHAM HIGH SCHOOL</b>  |                           |                      |          |         |              |            |          |  |
| Main Garage                | Mechanical Insulation     | 50 linear feet       | TSI      | YES     | Good         | 5          | 1        | Possibly inaccessible material also.   |
| Kitchen                    | Linoleum                  | 400 sq. ft           | MISC     | No      | Fair         | 5          | 1, 4     | Minor cracks throughout. Confirmation testing needed.  |
| Café                       | 12" Floor Tile and Mastic | 3,500 sq. ft         | MISC     | No      | Fair         | 5          | 1, 4     | Normal wear throughout. Confirmation testing needed  |
| Science Rooms 20 & 21      | 12" Floor Tile and Mastic | 6,000 sq. ft         | MISC     | No      | Good         | 5          | 1, 4     | Confirmation testing needed  |
| Room 22                    | Transite Fume Hood        | 15 sq. ft            | MISC     | No      | Good         | 5          | 1        |  |
| Teacher's Offices          | 12" Floor Tile and Mastic | 1520 Sq. Ft.         | MISC     | No      | Good         | 5          | 1, 4     | Confirmation testing needed  |
| SPED - 8                   | 12" Floor Tile and Mastic | 704 Sq. Ft.          | MISC     | No      | Good         | 5          | 1, 4     | Confirmation testing needed  |
| Nurse                      | 12" Floor Tile and Mastic | 144 Sq. Ft.          | MISC     | No      | Fair         | 5          | 1, 4     | Minor wear throughout. Confirmation testing needed   |
| Guidance                   | 12" Floor Tile and Mastic | 1300 Sq. Ft.         | MISC     | No      | Fair         | 5          | 1, 4     | Cracked tiles by door entrance. Confirmation testing needed  |
| Main Office                | 12" Floor Tile and Mastic | 800 sq. ft           | MISC     | No      | Good-Covered | MNO/5      | 1, 4     | 3/4 of the area is covered with carpet. Possible floor tiles underneath. Confirmation testing needed |
| Home Economics             | 12" Floor Tile and Mastic | 1,200 sq. ft         | MISC     | No      | Good         | 5          | 1, 4     | Confirmation testing needed  |
| Storage                    | Pipe Fitting Insulation   | 42 Observed          | TSI      | YES     | Fair         | 5          | 1, 4     | Few fittings have some minor damage and confirmation testing needed.                                 |
| Hall                       | 12" Floor Tile and Mastic | 1,872 sq. ft         | MISC     | No      | Fair         | 5          | 1, 4     | Normal wear throughout. Confirmation testing needed  |
| Notes on following page(s) |                           |                      |          |         |              |            |          |  |

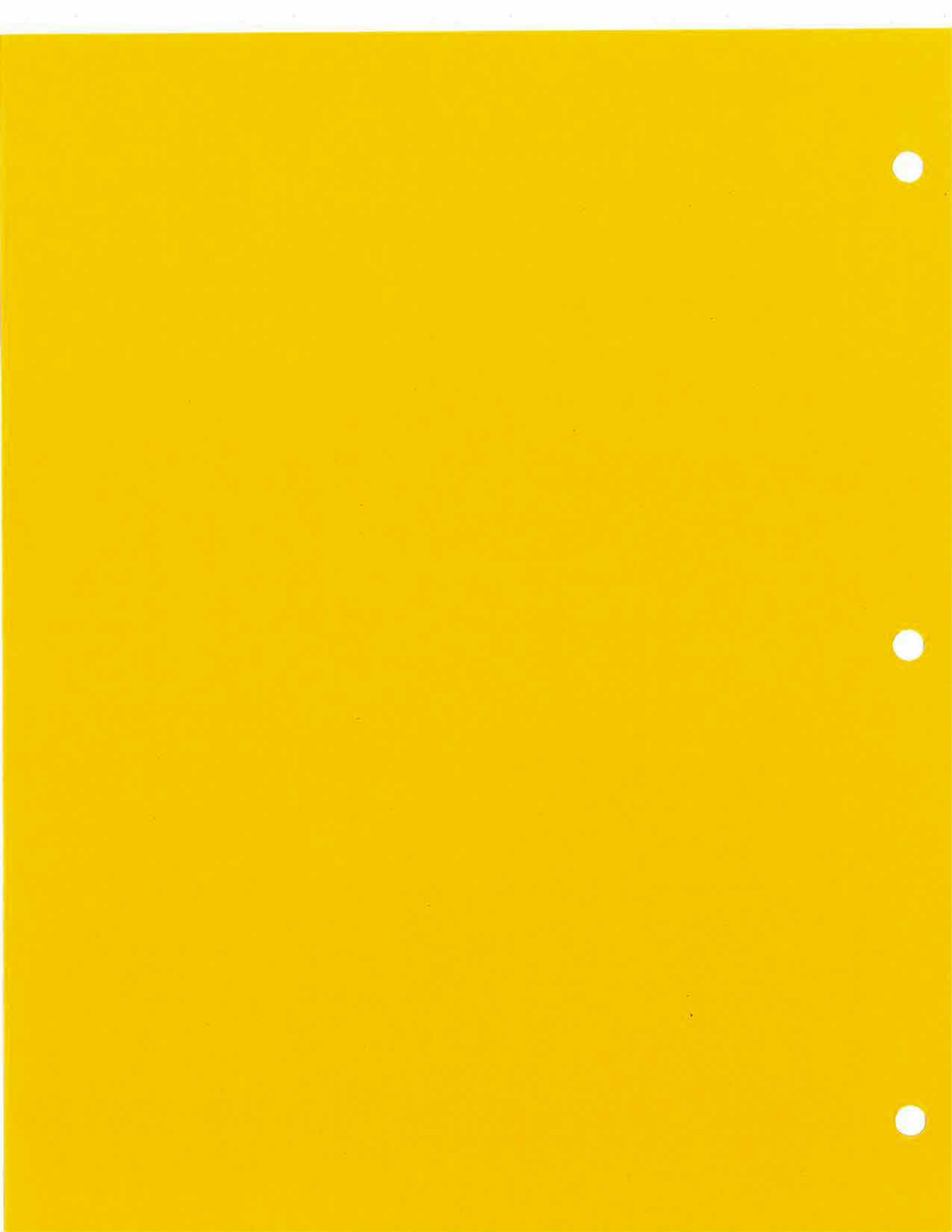
320 First NH Turnpike • Northwood, NH 03261 • 603-942-5432 Tel • 603-942-5300 Fax • 1-888-SAFE-AIR (888-723-3247) Toll Free

**S.A.U. 28: 3-Year . . . ERA Reinspection**

320 First NH Turnpike • Northwood, NH 03261 • 603-942-5432 Tel • 603-942-5432 Fax • 1-888-SAFE-AIR (888-723-3247) Toll Free

| Location  | ACBM  | Approximate Quantity | Category | Friable | Condition | Assessment | Response | Notes  |
|---|---|----------------------|----------|---------|-----------|------------|----------|--|
| Throughout  | Other suspect ACBM is present in and on the building that requires further review, testing, assessment and, based on the results modifications to the management plan may be required. In addition, interior and exterior inspection are required prior to any renovation or demolition work. |                      |          |         |           |            |          | See further discussion in report. Possible inaccessible ACBM also. |
| <b>Category:</b> MISC is miscellaneous material; TSI is thermal system insulation; SURF is surfacing material. Categorized in accordance with 40 CFR Part 763.  |   |                      |          |         |           |            |          |  |
| <b>Assessment Codes</b> based on 40 CFR Part 763: 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 ACM. Please reference AHERA and the school management plan for discussion on assessment codes. |   |                      |          |         |           |            |          |  |
| <b>Response Codes:</b> 1. Manage ACBM in accordance with Management Plan; 2. Conduct repairs and cleaning; 3. Conduct removal and cleaning; 4. Material suspect and requires further testing; 5. ACBM has been removed and may be removed from listings; 6. ACBM was not observed and further review is required. See further discussion and requirements in report.  |   |                      |          |         |           |            |          |  |





**School Administrative Unit No. 28 - Pelham School District**  
**Pelham High School**  
**85 Marsh Road**  
**Pelham, New Hampshire**

| Room No.                          | ACM Description             | EPA Category | Approximate Quantity  | EPA Assessment | Resp. Action | 6-Month Inspect. Changes* Y/N |
|-----------------------------------|-----------------------------|--------------|-----------------------|----------------|--------------|-------------------------------|
| Maintenance Garage                | Generator Exhaust           | TSI          | 15 LF                 | 7              | 1            | N                             |
| Kitchen                           | Linoleum                    | Misc.        | 400 ft <sup>2</sup>   | 5              | 1            | N                             |
| Cafeteria                         | Brown Floor Tile and Mastic | Misc.        | 3,500 ft <sup>2</sup> | 5              | 1            | N                             |
| Room 2                            | White Floor Tile and Mastic | Misc.        | 1,730 ft <sup>2</sup> | 5              | 1            | N                             |
| Rooms 3 & 4                       | Brown Floor Tile and Mastic | Misc.        | 2.240ft <sup>2</sup>  | 5              | 1            | N                             |
| Room 5                            | Brown Floor Tile and Mastic | Misc.        | 800 ft <sup>2</sup>   | 5              | 1            | N                             |
| Room 6                            | Brown Floor Tile and Mastic | Misc.        | 960 ft <sup>2</sup>   | 5              | 1            | N                             |
| SPED & Misc. Rooms by Rooms 6 & 7 | Brown Floor Tile and Mastic | Misc.        | 660 ft <sup>2</sup>   | 5              | 1            | N                             |

Notes: ft<sup>2</sup> = Square feet, LF=Linear Feet, If yes, note any changes for 6-Month re-inspection

6-Month Inspector: Stephen McPherson #AI000204

Date: February 23, 2011

**School Administrative Unit No. 28 - Pelham School District  
Pelham High School  
85 Marsh Road  
Pelham, New Hampshire**

| <b>Room No.</b>   | <b>ACM Description</b>               | <b>EPA Category</b> | <b>Approximate Quantity</b> | <b>EPA Assessment</b> | <b>Resp. Action</b> | <b>6-Month Inspect. Changes* Y/N</b> |
|-------------------|--------------------------------------|---------------------|-----------------------------|-----------------------|---------------------|--------------------------------------|
| Guidance          | Brown Floor Tile and Mastic          | Misc.               | 1,300 ft <sup>2</sup>       | 5                     | 1                   | N                                    |
| Nurse             | Brown Floor Tile and Mastic          | Misc.               | 150 ft <sup>2</sup>         | 5                     | 1                   | N                                    |
| Main Office       | Brown Floor Tile and Mastic          | Misc.               | 125 ft <sup>2</sup>         | 5                     | 1                   | N                                    |
| Room 8            | Brown Floor Tile and Mastic          | Misc.               | 700 ft <sup>2</sup>         | 5                     | 1                   | N                                    |
| Teachers Wok Room | Brown Floor Tile and Mastic          | Misc.               | 1,520 ft <sup>2</sup>       | 5                     | 1                   | N                                    |
| Corridors         | Brown Floor Tile and Mastic          | Misc.               | 1,900 ft <sup>2</sup>       | 5                     | 1                   | N                                    |
| Room 22 Science   | Asbestos-cement Board Fume Hoods (2) | Misc.               | 30 ft <sup>2</sup>          | 5                     | 1                   | N                                    |

Notes: ft<sup>2</sup> = Square feet, LF=Linear Feet, If yes, note any changes for 6-Month re-inspection

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| <b>Room No.</b>                       | <b>ACM Description</b>      | <b>EPA Category</b> | <b>Approximate Quantity</b> | <b>EPA Assessment</b> | <b>Resp. Action</b> | <b>6-Month Inspect. Changes*<br/>Y/N</b> |
|---------------------------------------|-----------------------------|---------------------|-----------------------------|-----------------------|---------------------|--|
| Second Floor, Work Room<br>By Room 34 | Brown Floor Tile and Mastic | Misc.               | 160 ft <sup>2</sup>         | 5                     | 1                   | N  |
| Room 33                               | Brown Floor Tile and Mastic | Misc.               | 1,200 ft <sup>2</sup>       | 5                     | 1                   | N  |

Notes: ft<sup>2</sup> = Square feet, LF=Linear Feet, If yes, note any changes for 6-Month re-inspection

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The EPA Assessment Codes identified in the Table above are as follows:

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

The Response Action Codes identified in the Table above are as follows:

1. Monitor identified material under the Operations and Maintenance Program.
2. Repair, encapsulate or enclose identified material, decontaminate immediate area, then monitor under the Operations and Maintenance Program.
3. Remove identified material, decontaminate immediate area. Remove material from Table above.