Educational Service Agency

Sponsor: NE Georgia Cooperative Educational Service Agency

Type Agreement: P.O. No. 8384 dated 8/4/83
Award Period: From 8/4/83 To 9/30/83
Sponsor Amount: Estimated: $500
Funded: $500
Total to Date

Cost Sharing Amount: $500 Cost Sharing No:

Title: Building Survey for Friable Asbestos Material

ADMINISTRATIVE DATA
1) Sponsor Technical Contact: Brian J. Lindberg X4820
2) Sponsor Admin/Contractual Matters: Mr. Charles L. Cain
   Director
   NE Georgia Cooperative Educational Service Agency
   875 Winter Street (GIST) 241-7675
   Winterville, GA 30683 (404) 742-8292

Defense Priority Rating: N/A
Military Security Classification: N/A
(or) Company/Industrial Proprietary: N/A

RESTRICTIONS
See Attached N/A Supplemental Information Sheet for Additional Requirements.
Travel: Foreign travel must have prior approval -- Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.
Equipment: Title vests with Sponsor; however none proposed.

COMMENTS:

COPY TO:
Project Director (Burson) Procurement/EES Supply Services GTRI
Research Administrative Network Research Security Services Library
Research Property Management (Reports Coordinator (OCA)) Project File
Accounting Research Communications (2) Other I. Newton

FORM OCA 4:383
Project Title: Building Survey For Friable Asbestos Material

Project No: A-3634

Project Director: J.L. Burson

Sponsor: NE Georgia Cooperative Educational Service Agency.

Effective Termination Date: 9/30/83

Clearance of Accounting Charges: 9/30/83

Grant/Contract Closeout Actions Remaining:

- [x] Final Invoice and Closing Documents
- [ ] Final Fiscal Report
- [ ] Final Report of Inventions
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other

Assigned to: EDL/SHD

COPIES TO:

- Research Property Management
- Accounting
- Procurement/EES Supply Services
- Research Security Services
- EES Public Relations (2)
- Computer Input
- Project File
- Other

BURSON

GTRI
ASBESTOS SURVEY
FOR
MADISON COUNTY HIGH SCHOOL
Danielsville, Georgia

PROJECT NO. A-3634

GEORGIA INSTITUTE OF TECHNOLOGY
Engineering Experiment Station
Environmental Health & Safety Division
Atlanta, Georgia 30332
September 20, 1983
INTRODUCTION

The Georgia Tech Research Institute was retained by the Northeast Georgia Cooperative Educational Service Agency of Winterville, Georgia to investigate the potential for asbestos exposure at Madison County High School in Danielsville, Georgia. This investigation was performed on August 19, 1983 by Mr. Kenneth E. Johnson of Georgia Tech. While at the facility, he was accompanied by Mr. Lyndol Cain of the Northeast Georgia CESA and Mr. James Perkins, Superintendent of the Madison County School System. The purpose of the survey was to review the sample results from previous sampling, to collect additional samples, if necessary, and to offer any pertinent recommendations. The following report summarizes the results of this study including conclusions and recommendations.

CONCLUSIONS

The sprayed-on ceiling coating contains the chrysotile form of asbestos. This was based upon the results of bulk samples collected earlier in the year and additional samples collected during this survey. Percentages of asbestos ranged from < 1% to 16% chrysotile. Results of the testing conducted during this survey are included as Appendix A.

The presence of asbestos in the sprayed-on coating is in conflict with the specification sheet for the material that was to have been used. Three separate sets of samples, analyzed by two different laboratories, all indicate the presence of asbestos. The percentages varied but some variance is to be expected.

The sprayed-on material had a low friability. It appeared to be in good repair and, due to the height of the ceilings, is not highly susceptible to vandalism. Routine maintenance activities, such as replacement of fluorescent light tubes, should not significantly disturb the sprayed-on material.

RECOMMENDATIONS

1. Careful consideration should be given before deciding which means will be taken to control the asbestos exposure. Based upon the condition of the material and its inaccessibility, encapsulation may be feasible. Before this is attempted, testing of the encapsulant should be conducted. See the discussion section of this report for details.

2. Should removal of the material not be attempted, the following recommendations would apply.
A. Notice to School Employees (Posting Requirement)

1. Notice to School Employees, EPA form 7730-3, in the final rule should be posted in the primary administrative and custodial offices and in the faculty common rooms of each school.

2. Content must be identical to EPA form 7730-3. Copy attached, see Appendix B.

3. Notice shall remain posted indefinitely in any school which has friable asbestos-containing material.

B. Guide for Reducing Asbestos Exposure

A copy of the "Guide for Reducing Asbestos Exposure", EPA form 7730-2 in the Final Rule, should be distributed to all custodial or maintenance employees. Copy attached, see Appendix B.

C. Written notice of location of friable asbestos materials to all building employees.

Local education authorities should provide all persons employed in the school a written notice of the location, by room or building area of all friable asbestos-containing material in the school.

D. Notice to Parent-Teacher Associations

Local education authorities should provide notice of the results of inspections and analyses to the Parent Teacher Association of that school. In addition EPA recommends that the notification include the following statement: "It is important to note that not all friable asbestos containing material need be removed from schools. Once such material has been identified a program can be implemented to ensure that the material is maintained in a good condition and that appropriate precautions are followed when the material is disturbed for any reason."

If there is no PTA for the school the local education authority should notify directly the parents of its pupils.

The format of the notices in items C and D are at the discretion of the local education authority.

3. In addition to the above-mentioned requirements of the standard, the following records must be maintained by each school:

   o Name and address of the school.

   o List of all school buildings associated with the school, indicated if inspection has been completed, and which buildings contain friable materials.

   o Copies of the Notice to school employees.
1. For schools which contain friable materials:

   a. A blueprint, diagram, or written description of the building which the location and area in square feet of each sampling area of such material(s), the location samples were taken, and the identification number of each sample, which describes whether each sampling area of friable materials contains asbestos, including an estimate of its asbestos content.

   b. Copies of all laboratory reports.

2. A statement that the requirements of the rule have been satisfied signed by the person responsible for compliance with the rule.

3. A committee should be established to evaluate alternative solutions and provide recommended action as necessary. This committee should select one person to be designated the Asbestos Coordinator.

4. The Asbestos Coordinator should oversee all activities concerning the fireproofing including any abatement procedures, public relations, recordkeeping, etc.

5. Obtain legal counsel regarding potential liabilities resulting from asbestos-related problems. This person (firm) may serve as a member of the committee.

6. Obtain the guidance of an architect regarding building codes, fire codes, etc. that must be considered during any asbestos abatement activities.

7. Until such time that the fireproofing is removed from the building, standard operating procedures should be established to protect building occupants from exposure during maintenance activities by in-house or contractor personnel. These procedures should require at minimum the following:

   a. Notification of the Asbestos Coordinator before any maintenance work (above the ceiling tile or other work expected to create asbestos-containing dust) begins.

   b. The air handling system from the work area should be shut down and sealed before work begins.

   c. The work area should be physically isolated from all other areas (barriers constructed of polyethylene plastic work well for this).

   d. Warning signs should be posted at all entrances and exits to the work area.

   e. The work area should have no openings where air containing asbestos might escape.

   f. The floor should be covered with plastic (minimum 6 mil) to protect it from asbestos contamination and water damage.

   g. All movable items should be removed from the work area and stationary items sealed in plastic.
- No mechanized equipment should be used in direct contact with the fireproofing unless equipped with HEPA* filtered local exhaust.

- All workers or other persons entering the work area must wear respiratory protection approved by the National Institute for Occupational Safety and Health (NIOSH) for use in atmospheres containing asbestos. Note: Disposable respirators will not offer adequate protection under most circumstances.

- All personnel required to wear a respirator will need to be enrolled in a respiratory protection program which meets the specifications of the OSHA standard (29 CFR 1910.134, see Appendices C and D).

- All persons entering the work area should wear appropriate full body protective covering. (Disposable coveralls work well for this purpose).

- Waste should be bagged while wet.

- All waste generated should be bagged and labeled according to EPA and OSHA and disposed of at an approved landfill.

- Upon completion of work, all surfaces should be vacuumed with a HEPA filtered vacuum or wet-wiped. After waiting 24 hours for dust to settle, this should be repeated.

- Air sampling should be conducted during and immediately following maintenance activities which might disturb the fireproofing or settled dust. This should include personal samples for the workers and area samples immediately outside the work area. Upon completion of final clean-up, additional air samples must be taken.

- All air sample results should be reported to the Asbestos Coordinator within 24 hours in order that appropriate action can be taken if needed.

- The standard operating procedures must be strictly enforced for building personnel and contractor personnel.

9. All building maintenance personnel should be provided with annual physical examinations as required by the OSHA standard (see Appendix C).

10. All medical and air monitoring records must be maintained for a period of at least 30 years.

DESCRIPTION OF FACILITY

The Madison County High School is located in Danielsville, Georgia. It was constructed in two phases, in or around 1970 and 1972. It is a one-story building with sprayed-on acoustical material on all exposed concrete ceilings. Ceilings were approximately twelve feet in height and were not easily accessible. The depth of the sprayed-on material was approximately one-half inch. The appearance

* HEPA - High efficiency particulate absolute.
of the material is similar throughout the building.

Floor plans of the building have been included as Appendix E of this report. The areas from which the three bulk samples were taken have been identified.

DISCUSSION

This survey was designed to review lab results obtained after bulk samples were collected by school officials earlier this year. The results indicated the chrysotile form of asbestos in amounts varying from <1% to 16%. All samples collected were positive for asbestos content. Material provided by the architectural firm stated that "the specified finish for these ceilings is paint (and) there is no asbestos in the paint specifications". This conflicting report led to confusion for school officials.

As a third check, three bulk samples were collected, one each from a classroom, a storage area, and the construction shop. All three again indicated the chrysotile form of asbestos in amounts of <1%, 2%, and 10% respectively.

There are four approaches that can be taken after determining there are asbestos-containing materials in a building. These are described below along with advantages and disadvantages of each approach.

1. "Do Nothing" Approach - This is also called the "deferred action" approach. This approach may be appropriate when there is negligible exposure potential. The advantage is obviously that there is no immediate cost associated with doing nothing. The disadvantages are numerous. The potential for exposure may increase. A permanent operations and maintenance plan, as described in Section 2.2.10 is required. Continuous inspection and re-evaluation is necessary. If demolition of the building is done, the material must be removed. (This is a requirement by EPA.)

2. Encapsulation - This approach is appropriate only if the material is of low friability, still retains bonding integrity, and is not accessible. It involves the use of a coating (latex, epoxy, etc.) which encapsulates the material. It is usually rapid and economical and can control fiber release under the conditions discussed above. There are several disadvantages to this approach. The source of the asbestos still remains in the building. The weight of the encapsulant can sometimes cause the asbestos material to delaminate or break away from the surface to which it is attached. A detailed operations and maintenance plan is required along with continuing inspection of the encapsulated surface. In addition, encapsulated material is very difficult to remove if that becomes necessary (during renovation or demolition).

3. Enclosure - This approach involves the use of a physical barrier to enclose the areas containing asbestos materials. Any fiber release is contained within the enclosure provided the enclosure is maintained. It is also rapid and less expensive than removal. Like encapsulation, it also has several disadvantages. The asbestos remains in the building. The enclosure may require costly changes in the building such as lighting changes. A detailed operations and maintenance plan is required. Entry into the enclosure may be necessary for repairs or maintenance.

4. Removal - The physical removal of asbestos containing material is the only way
to eliminate the source of the asbestos. This also eliminates the potential for future problems. This approach should receive strong consideration when there is high exposure, when the material is deteriorating, when it is accessible, and when open material surfaces exist. This approach also has disadvantages. It is the most costly, complicated, and time-consuming method. For fire protection, the surfaces may need replacement material applied. Unless properly removed and adequate controls are taken, removal can cause a higher exposure to asbestos hazards. It is extremely important that proper removal and clean-up procedures are followed.

It has been recommended that consideration be given to encapsulating the asbestos-containing material since the material has a low friability, still retains bonding integrity, and is not easily accessible. If this is done, it is critical that the encapsulant be tested thoroughly. The sealant (or encapsulant) should penetrate the asbestos-containing material and adhere to the substrate (or form a tough skin over the material), withstand moderate impact, be flexible and flame retardant, resist deterioration over time and be non-toxic. EPA recently sponsored an evaluation of over 100 sealants using five criteria: impact resistance, flame spread, smoke generation, toxic gas release during combustion, and adhesive/cohesive strength (USEPA 1981). The American Society of Testing and Materials (ASTM) also is developing laboratory testing criteria for sealants. Additional information on the EPA sealant study can be obtained from EPA’s Office of Toxic Substances, Industry Assistance Office, (800)334-8571.

Although the EPA study can help building owners choose a sealant, each sealant being considered should be tested on site. In this way, its effectiveness on the materials under consideration can be seen. Testing should be done over several days. The ASTM activity noted above will include criteria and procedures for field as well as laboratory tests. Material that is deteriorated or delaminated, or that shows extensive damage, should not be encapsulated. If encapsulated, the additional weight will pull it down; if deteriorated, it may be blown off by application of sealant; if extensively damaged, it may be subject to repeated abuse and the sealant will not hold up. The condition of the sealant on previously encapsulated materials also should be inspected. Reapplication of sealant may be necessary.

Latex paint also has been used as a sealant. Its applicability is likewise limited to granular, cementitious materials. If latex paint is to be used, a brand with a high vehicle content (at least 60 percent by weight) and at least 25 percent (by weight) vehicle resin solids should be selected. For the purpose of encapsulating asbestos-containing material, paint should be applied considerably thicker than recommended for painting purposes. Experience suggests that coverage should be no more than 100 square feet per gallon.

Sealant should be applied with airless spray equipment. One recommended method is to apply a light (mist) coat, then a full coat applied at a 90 degree angle to the direction of the first. Latex paint can also be applied by roller following the application of the mist coat before it dries.

Encapsulation may be as costly as removal and disposal. This is largely due to the need for work area containment and workers' protection measures during sealant application. As with enclosure, no additional costs to replace asbestos-containing material are necessary. However, long-run costs are likely to be more
than for removal due to (1) continuing inspection, (2) periodic reapplication of sealant, and (3) removal of asbestos-containing material before building demolition. (Encapsulation may make eventual removal more costly and hazardous since the material will probably need to be removed in dry form.)

Should encapsulation be decided upon, it is recommended that annual air sampling be conducted with analysis by electron microscopy to detect the presence of asbestos fibers in the air. Although costly (approximately $300 - $500 per sample), this method can detect very small fibers that are not detected by polarized light microscopy but are thought, by many, to be the most significant in inducing biological effects in man.

This report prepared by:

Kenneth E. Johnson, CSP
Leader, Safety Group

This report reviewed by:

James L. Burson, CIH, CSP
Chief, Environmental Health and Safety Division

APPENDIX A

Results of Bulk Sample Analyses
# RESULTS OF BULK SAMPLE ANALYSES

FOR

MADISON COUNTY HIGH SCHOOL

GTRI Project A-3634

<table>
<thead>
<tr>
<th>Lab ID Number</th>
<th>Sample Description</th>
<th>Asbestos (Yes/No)</th>
<th>Analytical Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>5377</td>
<td>Ceiling material from Classroom #1</td>
<td>Yes</td>
<td>&lt;1% Chrysotile in Perlite and Particulate</td>
</tr>
<tr>
<td>5378</td>
<td>Ceiling material from Food Storage Room</td>
<td>Yes</td>
<td>2% Chrysotile in Calcite</td>
</tr>
<tr>
<td>5379</td>
<td>Ceiling material from Construction Shop</td>
<td>Yes</td>
<td>10% Chrysotile in Calcite</td>
</tr>
</tbody>
</table>
APPENDIX B

EPA Regulation for Friable Asbestos-Containing Materials in Schools
(40 CFR 763.100)
This regulation was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291.

VIII. Paperwork Reduction Act

The Paperwork Reduction Act of 1980, 44 U.S.C. 3510 et seq. (the "Act"), authorized the Director of OMB to review certain information collection requests by Federal agencies. EPA has determined that the recordkeeping and reporting requirements of this rule constitute a "collection of information" as defined in 44 U.S.C. 3502(4). In accordance with the Act, the recordkeeping and reporting of this rule has been reviewed by OMB and the Federal Education Data Acquisition Council. The OMB control number is (2000-0453).

List of Subjects in 40 CFR Part 763

Environmental protection, Hazardous materials, Recordkeeping and reporting requirements, Asbestos.

Dated: May 21, 1982.

Anne M. Gorsuch,
Administrator.

Therefore, Chapter I of Title 40 of the Code of Federal Regulations is amended by adding a new Part 763 consisting at this time of Subpart F to read as follows:

PART 763—ASBESTOS

Subparts—A—E [Reserved]

Subpart F—Friable Asbestos-Containing Materials in Schools

Sec.

763.100 Scope and purpose.
763.103 Definitions.
763.105 Inspection for friable material.
763.107 Sampling friable material.
763.109 Analyzing friable material.
763.111 Warnings and notifications.
763.114 Recordkeeping.
763.115 Compliance.
763.117 Exemptions.
763.119 References.

Appendix A—Interim Methods for the Determination of Asbestos in Bulk Insulation Samples.


Subparts—A—E [Reserved]

Subpart F—Friable Asbestos-Containing Materials in Schools

§ 763.100 Scope and purpose.

(a) This rule requires local education agencies to identify friable asbestos-containing material in public and private schools by visually inspecting school buildings for friable materials, sampling such materials, and having samples analyzed by appropriate techniques referred to in the rule. In addition, the rule requires local education agencies to post a notice of the results of inspections and analyses. The rule requires local education agencies to provide warnings on the health effects of asbestos and instructions on methods to avoid or reduce exposure to school employees of any school with friable asbestos-containing material and to notify parent-teachers associations of the results of inspections. The rule also includes recordkeeping requirements. Local education agencies may contractually delegate their duties under this rule, but they remain responsible for the proper performance of those duties. Local education agencies are encouraged to consult with EPA Regional Asbestos Coordinators for assistance in complying with this rule.

(b) The addresses and telephone numbers of the EPA Regional Asbestos Coordinators are:

(1) EPA Region I
Asbestos Coordinator
Air and Hazardous Materials Division
JFK Federal Bldg.
Boston, MA 02233
(617) 223-0685

(2) EPA Region II
Asbestos Coordinator
Room 1013, Woodbridge Avenue
Edison, NJ 08837
(201) 321-0688

(3) EPA Region III
Asbestos Coordinator
Curtis Building
Sixth and Walnut Streets
Philadelphia, PA 19106
(215) 667-0659, 507-9683

(4) EPA Region IV
Asbestos Coordinator
345 Courtland Street
Atlanta, GA 30365
(404) 881-9664

(5) EPA Region V
Asbestos Coordinator
230 S. Dearborn St.
Chicago, IL 60604
(312) 866-6003

(6) EPA Region VI
Asbestos Coordinator
First Federal Complex
1221 Elm Street
Dallas, TX 75270
(214) 767-2734

(7) EPA Region VII
Asbestos Coordinator
324 East 11 Street
Room 1500
[Material that is homogeneous in texture. Where the term "nonprofit" non-profit elementary or secondary education for grade 12 or under as determined under State law, or any school of any Agency of the United States.

(b) "School buildings" means:
(1) Structures used for the instruction of school children, including classrooms, laboratories, libraries, research facilities and administrative facilities.
(2) School eating facilities, and school kitchens.
(3) Gymnasiums or other facilities used for athletic or recreational activities, or for courses in physical education.
(4) Dormitories or other living areas of residential schools.
(5) Maintenance, storage, or utility facilities essential to the operation of the facilities described in subparagraphs 1 through 4 of this paragraph.

(c) "Asbestos-containing material" means any material which contains more than 1 percent asbestos by weight.

(d) "Asbestos" means the asbestiform varieties of: chrysotile (serpentine); crocidolite (riebeckite); amosite (cumminstonite-grunerite); anthophyllite; tremolite; and actinolite.

(e) "Local education agency" means:
(1) Any local education agency as defined in section 186(a)(10) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2801, et seq.
(2) The governing authority of any nonprofit elementary or secondary school.
(3) Any local education agency as defined in section 641(a) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2801, et seq.
(4) Dormitories or other living areas of residential schools.

(f) "Friebile material" means any material applied onto ceilings, walls, structural members, piping, ductwork, or any other part of the building structure which when dry may be crumbled, pulverized, or reduced to powder by hand pressure.

(g) "School" means any public or private day or residential school that provides elementary or secondary education for grade 12 or under as determined under State law, or any school of any Agency of the United States.

(h) "Use of asbestos" means the presence of asbestos-containing material in school buildings.

(i) "Use of asbestos" means the presence of asbestos-containing material in school buildings.

(j) "Use of asbestos" means the presence of asbestos-containing material in school buildings.


(m) "Asbestos-Containing Materials in School Buildings: A Guidance Document," Part 1, Chapter 5, for further information on sampling procedures.


(s) "Asbestos-Containing Materials in School Buildings: A Guidance Document," Part 1, Chapter 5, for further information on sampling procedures.


{Billing code 6500-50-W}
NOTICE TO SCHOOL EMPLOYEES

In accordance with EPA regulations, this school has been inspected for friable (easily crumbled) materials which contain asbestos. Friable asbestos-containing material may cause health problems.

Friable asbestos-containing material is present in

(Name of School)

A record of the inspection, a diagram of the location(s) of friable asbestos-containing materials, and a copy of relevant EPA regulations are available in

<table>
<thead>
<tr>
<th>Building</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

For further information, interested persons should call 800-424-9065 (554-1404 in the Washington, DC area).

Signed:

(Name)

(Title)

(Date)

EPA Form 7730-3 (8-82)
BILLING CODE 8450-50-C
(b) Local education agencies shall provide to all persons employed in school buildings under their authority which contain friable asbestos-containing materials a written notice of the location, by room or building area, of all friable asbestos-containing materials in the school.

(c) The following information on interim procedures to reduce exposures, "A Guide for Reducing Asbestos Exposure," shall be provided to all custodial or maintenance employees:
A GUIDE FOR REDUCING ASBESTOS EXPOSURE

PURPOSE

Your school building contains materials which contain asbestos and may release fibers into the air. Breathing asbestos fibers is dangerous. This fact sheet tells how to reduce exposure to asbestos fibers. Please read it carefully.

PROTECTING YOURSELF FROM ASBESTOS

Some of the friable building materials in your school contain asbestos. Friable asbestos-containing materials crumble easily and release fibers into the air. Breathing these fibers may cause cancer and other diseases. The more asbestos you breathe, the greater your chances are of getting disease. You can take precautions that will reduce or eliminate the risk of being exposed to asbestos.

Find out from your supervisor where these friable asbestos-containing materials are in your building. Do not touch or disturb them unless you have to. If you must handle an asbestos-containing material, first lightly spray it with water. EPA recommends using water which contains wetting agents, if they are available. Wet asbestos-containing materials will not release as many fibers.

Even if friable asbestos-containing materials are not disturbed, they may release asbestos fibers, which will fall slowly to the floor. If you are cleaning in areas which contain these materials, do not use a broom; it will stir the fibers into the air. Do not use a vacuum cleaner unless it is equipped with a High Efficiency Particulate Absolute filter. The fibers are so small they can pass through an ordinary vacuum cleaner and out into the room.

When cleaning in areas which contain friable asbestos-containing materials, use dampened mops and dustcloths. Dampened mops and dustcloths will hold the fibers much better than dry mops and dustcloths, and will reduce the number of fibers put back into the air. Use either lightly dampened mops or cloths or a vacuum with a High Efficiency Particulate Absolute filter to clean areas where wet mopping cannot be used (such as carpeting or hardwood floors).

Clean tables and chairs in the area with damp clothes. Do not dust them with brushes or with dry cloths, and do not vacuum them.

After you use the mop heads and cloths, put them in a plastic bag while they are still wet. Dislodged materials should also be placed in plastic bags for disposal.

A LIST OF IMPORTANT POINTS TO REMEMBER

1. Do not handle or disturb friable asbestos-containing materials unless necessary.

2. If you must handle asbestos-containing materials, wet them first.

3. If you must disturb asbestos (for example, to repair a light), see your supervisor before starting work. Then:
   a. Place a plastic dropcloth below the work area.
   b. Spray asbestos-containing material with water before you disturb it.
   c. Make sure that only those persons who are necessary for the job are in the area.
   d. Put all the asbestos you remove into a heavy plastic bag. Seal the bag and discard it.
   e. After the job, clean all the ladders and tools you used with a wet cloth.
   f. Roll up the dropcloth carefully and put it in a plastic bag. Discard the bag.
   g. Clean the floor below the work area with a wet mop.
   h. Put the mop head and the cloth used to clean the ladders in a plastic bag while they are still wet, seal the bag, and discard it.

4. If you must disturb or remove large sections of asbestos-containing material, see your supervisor before you begin. The National Institute for Occupational Safety and Health recommends that a respirator approved for toxic dusts be worn during such work.

You should make arrangements to turn off the school's ventilation system if you are disturbing or removing large sections of asbestos-containing material. The ventilation system should remain off until the work is completed and the area has been cleaned.

EPA Form 7730-2 (8-82)
BILLING CODE 8640-50-C
d) Local education agencies shall provide notice of the results of inspections and analyses in each school, which friable asbestos materials are found and to the appropriate parent-teacher association of that school. If there is no parent-teacher association for the school, the local education agency shall notify directly the parents of its pupils.

763.114 Recordkeeping.
(a) Local education agencies shall compile and maintain in the administrative office of each school under their authority a record which shall include:
   (1) The name and address of the school.
   (2) A list of all school buildings associated with the school, indicating whether each building has been inspected for friable materials in compliance with § 763.105, and which buildings contain friable materials.
   (3) Copies of the Notice to School Employees, found in § 783.111(a).
   (4) For each school building which contains friable materials:
       (i) A blueprint, diagram, or written description of the building which identifies clearly the location(s) and approximate area(s) in square feet of each sampling area of such material(s), the locations at which samples were taken, and the identification number of each sample, and which shows or describes clearly whether each sampling area of friable material contains asbestos, including an estimate of its percent asbestos content as determined by calculating the average of the percent asbestos contents of all samples taken in that area.
       (ii) A copy of all laboratory reports and all correspondence with laboratories concerning the analysis of samples taken in accordance with § 783.107.
   (5) If the school contains friable asbestos-containing materials, copies of the “Guide for Reducing Asbestos Exposure” contained in § 763.111(b), and one copy of “Asbestos-Containing Materials in School Buildings: A Guidance Document,” Parts 1 and 2 (EPA No. C000090), which can be obtained by calling 800-424-6065.
   (b) Statement that the requirements of the rule have been satisfied signed by the person responsible for compliance with the rule and including the date and the person’s name and title.

763.105, and which schools contain friable materials.
(b) Local education agency shall retain in the administrative office of the agency:
   (1) A list of all schools under its authority, indicating whether schools were inspected in accordance with § 763.105, and which schools contain friable materials.
   (2) A record of the friable materials in schools which were sampled and analyzed in accordance with §§ 763.107 and 763.109, indicating which materials contain asbestos.
   (3) For each school which contains friable asbestos-containing materials, the total area of such materials in square feet, and the total number of school employees who regularly work in the school.
(c) Form. Each local education agency shall complete and retain in the administrative office of the local education agency the following form “Inspections for Friable Asbestos-Containing Materials.”
# INSPECTIONS FOR FRIABLE ASBESTOS-CONTAINING MATERIALS

1. Please provide the following information about the local education agency:

<table>
<thead>
<tr>
<th>NAME OF AGENCY</th>
</tr>
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<th>COUNTY</th>
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<th>ZIP CODE</th>
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Please fill in the following information about the schools under the authority of this local education agency:

2. The number of schools which have been inspected for friable materials in accordance with §763.106 of Title 40 of the Code of Federal Regulations.

3. The number of schools where friable materials are present.

If the answer to question 3 is none, disregard questions 4 — 7 and go on to the certification. Otherwise, fill in the following information about the schools enumerated in question 3:

4. The number of schools in which all friable materials have been sampled and analyzed in accordance with §§763.107 and 763.109 of Title 40 of the Code of Federal Regulations.

5. The number of schools with friable material(s) that contain(s) asbestos.

If the answer to question 5 is none, disregard questions 6 — 7 and go on to the certification. Otherwise, fill in the following information about the schools enumerated in question 5:

6. The total area in square feet of all friable asbestos-containing materials found in these schools.

7. The total number of school employees who regularly work in schools where friable asbestos-containing materials are present.

CERTIFICATION: Please read and sign below the following statement:

I hereby certify that this local education agency has complied with the EPA regulation 40 CFR 763.100 through 763.117, "Asbestos-Containing Materials in Schools Identification and Notification," and that the information on this form is, to the best of my knowledge, true and complete.

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Additional forms can be obtained by calling 800-424-9065 (554-1404 in the Washington, DC area).

EPA Form 7735-1 16-821
BILLING CODE 6550-50-C
buildings where it was determined that education agencies, or municipal or State school asbestos program shall constitute compliance with this regulation to the extent that such actions conform to the requirements of this regulation.

(c) Section 15(1) of TSCA (15 U.S.C. 2616) makes it unlawful for any person to fail or refuse to comply with any rule promulgated or order issued under section 8 of TSCA (15 U.S.C. 2605). Thus, failure to comply with any aspect of this rule constitutes a violation as defined by section 15(1) of TSCA.

(d) Section 16(a) of TSCA (15 U.S.C. 2618) provides that any person who violates any provision of section 15 shall be liable to the United States for civil penalties. If a violation is knowing or willful, criminal penalties may also be assessed. Under section 17 of TSCA (15 U.S.C. 2618), the Agency may take such action as to restrain persons from violating a rule promulgated under section 8 of TSCA.

763.117 Exemptions.

(a) Schools that were inspected, sampled, and analyzed prior to this rule.

1. Schools are exempt from §§ 763.105, 763.107, and 763.109. If, prior to the effective date of this rule, local education agencies, or municipal or State agencies, acting on their behalf, have:

(i) Visually inspected all areas of the school for friable materials.

(ii) Sampled each type of friable material found in the school, as distinguished by different appearance or texture.

(iii) Had the sample(s) analyzed using Polarized Light Microscopy supplemented by X-ray Diffraction where necessary, or by Electron Microscopy.

This exemption for previous sampling activity does not apply to school buildings where it was determined that a friable material does not contain asbestos based on fewer than three samples of the material.

2. If a school was found to contain friable asbestos-containing materials, then §§ 763.111, 763.114 and 763.115, the recordkeeping and notification requirements, shall apply to the local education agencies.

3. If a school was found to contain no friable asbestos-containing materials, the school also is exempt from §§ 763.111, 763.114, and 763.115, the recordkeeping and notification requirements, provided the school retains a copy of all laboratory reports and all correspondence with laboratories concerning the analyses of samples taken and maintains in the school record the following certifying statement, signed and dated by the person responsible for compliance with the rule: "I hereby certify that this school, to the best of my knowledge, does not contain friable asbestos-containing materials."

(b) Schools which can document that no friable asbestos-containing building materials were used in construction, modification, or renovation. A school is exempt from §§ 763.105, 763.107, and 763.109, the inspection, sampling, and analysis requirements, and §§ 763.111, 763.114, and 763.115, the recordkeeping and notification requirements, if:

(1) the school record contains documentation showing that, at the time of construction, modification, or renovation, no friable asbestos-containing building materials were used. To qualify for this exemption, documentation must clearly show that the friable materials used did not contain asbestos.

(2) the school record contains the following certifying statement, signed and dated by the person responsible for compliance with the rule: "I hereby certify that this school, to the best of my knowledge, does not contain friable asbestos-containing materials."

(c) Other exemptions. (1) Sections 763.105, 763.107, and 763.109 shall not apply to a school in which the record contains a signed statement certifying that any friable materials in the school shall be treated for purposes of this rule as asbestos-containing. In this case, the record shall also include information on the location of these materials.

Appendix A—Interim Method of the Determination of Asbestos in Bulk Insulation Samples

Section 1. Polarized Light Microscopy

1.1 Principle and Applicability

Bulk samples of building materials taken for asbestos identification are first examined for homogeneity and preliminary fiber identification at low magnification. Positive identification of suspect fibers is made by analysis of subsamples with the polarized light microscope.

The principles of optical mineralogy are well established. A light microscope equipped with two polarizing filters is used to observe specific optical characteristics of a sample. The use of plane polarized light allows the determination of refractive indices along specific crystallographic axes. Morphology and color are also observed. A retardation plate is placed in the polarized light path for determination of the sign of elongation using orthoscopic illumination. Orientation of the two filters such that their vibration planes are perpendicular (crossed polars) allows observation of the birefringence and extinction characteristics of anisotropic particles.
APPENDIX C

OSHA's Asbestos Standard
(29 CFR 1910.1001)
OSHA
1910.1001 - ASBESTOS

(a) Definitions

For the purpose of this section.

(1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos fibers longer than 5 micrometers.

(b) PERMISSIBLE EXPOSURE TO AIRBORNE CONCENTRATIONS OF ASBESTOS FIBERS

(1) Standard effective July 7, 1972. The 8-hour, time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed five fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(2) Standard effective July 1, 1976. The 8-hour, time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed two fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(3) Ceiling concentration. No employee shall be exposed at any time to airborne concentration of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(c) METHODS OF COMPLIANCE

(1) ENGINEERING METHODS

(i) Engineering controls. Engineering controls, such as but not limited to, isolation, enclosure, exhaust ventilation, and dust collection, shall be used to meet the exposure limits prescribed in paragraph (b) of this section.

(ii) LOCAL EXHAUST VENTILATION

(a) Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1971, which is incorporated by reference herein.
(b) See Section 1910.6 concerning the availability of ANSI-A9.2-1971, and the maintenance of a historic file in connection therewith. The address of the American National Standards Institute is given in Section 1910.100.

(iii) PARTICULAR TOOLS

All hand-operated and power-operated tools which may produce or release asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, such as, but not limited to, saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems in accordance with subdivision (ii) of this subparagraph.

(2) WORK PRACTICES

(i) Wet methods. Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers in excess of the exposure limits prescribed in paragraph (b) of this section, unless the usefulness of the product would be diminished thereby.

(ii) Particular products and operations. No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne asbestos fibers in excess of the limits prescribed in paragraph (b) of this section.

(iii) Spraying, demolition, or removal. Employees engaged in the spraying of asbestos, the removal, or demolition of pipes, structures, or equipment covered or insulated with asbestos, and in the removal or demolition of asbestos insulation or coverings shall be provided with respiratory equipment in accordance with paragraph (d) (2) (iii) of this section and with special clothing in accordance with paragraph (d) (3) of this section.

(d) PERSONAL PROTECTIVE EQUIPMENT

(1) Compliance with the exposure limits prescribed by paragraph (b) of this section may not be achieved by the use of respirators or shift rotation of employees, except:

(i) During the time period necessary to install the engineering controls and to institute the work practices required by paragraph (c) of this section;

(ii) In work situations in which the methods prescribed in paragraph (c) of this section are either technically not feasible or feasible to an extent insufficient to reduce the airborne concentrations of asbestos fibers below the limits prescribed by paragraph (b) of this section; or
(iii) In emergencies.

(iv) Where both respirators and personnel rotation are allowed by subdivision (i) and (ii), or (iii) of this subparagraph, and both are practicable, personnel rotation shall be preferred and used.

(2) Where a respirator is permitted by subparagraph (i) of this paragraph, it shall be selected from among those approved by the Bureau of Mines, Department of the Interior, or the National Institute for Occupational Safety and Health Department, of Health, Education, and Welfare, under the provisions of 30 CFR Part 11 (37 P.R. 6244, March 25, 1972), and shall be used in accordance with subdivisions (i), (ii), (iii), and (iv) of this subparagraph.

(i) Air purifying respirators. A reusable or single use air purifying respirator, or a respirator described in subdivision (ii) or (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour, time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed no more than 10 times those limits.

(ii) Powered air purifying respirators. A full facepiece powered air purifying respirator, or a powered air purifying respirator, or a respirator described in subdivision (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour, time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed 10 times, but not 100 times, those limits.

(iii) Type "C" supplied-air respirators, continuous flow or pressure-demand class. A type "C" continuous flow or pressure-demand, supplied air respirator shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour, time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed 100 times those limits.

(iv) ESTABLISHMENT OF A RESPIRATOR PROGRAM

(a) The employer shall establish a respirator program in accordance with the requirements of the American National Standard Practices for Respiratory Protection, ANSI Z88.2-1969, which is incorporated by reference herein.

(b) See Section 1910.6 concerning the availability of ANSI Z88.2-1969 and the maintenance of an historic file in connection therewith. The address of the American National Standards Institute is given in Section 1910.100.
(c) No employee shall be assigned to tasks requiring the use of respirators if, based upon his most recent examination, an examining physician determines that the employee will be unable to function normally wearing a respirator, or that the safety or health of the employee or other employees will be impaired by his use of the respirator. Such employee shall be rotated to another job or given the opportunity to transfer to a different position whose duties he is able to perform with the same employer, in the same geographical area and with the same seniority, status, and rate of pay he had just prior to such transfer, if such a different position is available.

(3) Special Clothing: The employer shall provide, and require the use of, special clothing, such as coveralls or similar whole body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos fibers, which exceed the ceiling level prescribed in paragraph (b) of this section.

(4) Change rooms:

(i) At any fixed place of employment exposed to airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, the employer shall provide change rooms for employees working regularly at the place.

(ii) Clothes lockers: The employer shall provide two separate lockers or containers for each employee, so separated or isolated as to prevent contamination of the employee's street clothes from his work clothes.

(iii) Laundering:

(a) Laundering of asbestos-contaminated clothing shall be done so as to prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(b) Any employer who gives asbestos-contaminated clothing to another person for laundering shall inform such person of the requirement in (a) of this subdivision to effectively prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(c) Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable bags, or other closed, impermeable containers, and labeled in accordance with paragraph (g) of this section.

(e) METHOD OF MEASUREMENT

All determinations of airborne concentrations of asbestos fibers shall be made by the membrane filter method at 400-450 x (magnification) (4 millimeter objective) with phase contrast illumination.
(f) MONITORING

(1) Initial determinations. Within 6 months of the publication of this section, every employer shall cause every place of employment where asbestos fibers are released to be monitored in such a way as to determine whether every employee's exposure to asbestos fibers is below the limits prescribed in paragraph (b) of this section. If the limits are exceeded, the employer shall immediately undertake a compliance program in accordance with paragraph (c) of this section.

(2) Personal Monitoring

(i) Samples shall be collected from within the breathing zone of the employees, on membrane filters of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour, time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by subparagraph (i) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of employees. In no case shall the sampling be done at intervals greater than 6 months for employees whose exposure to asbestos may reasonably be foreseen to exceed the limits prescribed by paragraph (b) of this section.

(3) Environmental Monitoring

(i) Samples shall be collected from areas of a work environment which are representative of the airborne concentrations of asbestos fibers which may reach the breathing zone of employees. Samples shall be collected on a membrane filter of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour, time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by subparagraph (i) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. In no case shall sampling be at intervals greater than 6 months for employees whose exposures to asbestos may reasonably be foreseen to exceed the exposure limits prescribed in paragraph (b) of this section.

(4) Employee observation of monitoring. Affected employees, or their representatives, shall be given a reasonable opportunity to observe any monitoring required by this paragraph and shall have access to the records thereof.
(g) CAUTION SIGNS AND LABELS

(1) Caution Signs

(i) Posting. Caution signs shall be provided and displayed at each location where airborne concentrations of asbestos fibers may be in excess of the exposure limits prescribed in paragraph (b) of this section. Signs shall be posted at such a distance from such a location so that an employee may read the signs and take necessary protective steps before entering the area marked by the signs. Signs shall be posted at all approaches to areas containing excessive concentrations of airborne asbestos fibers.

(ii) Sign specifications. The warning signs required by subdivision (i) of this subparagraph shall conform to the requirements of 20" x 14" vertical format signs specified in Section 1910.145(d)(4), and to this subdivision. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to that specified in this subdivision.

LEGEND

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<th>NOTATION</th>
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<tbody>
<tr>
<td>Asbestos</td>
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<tr>
<td>Dust Hazard</td>
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<tr>
<td>Avoid Breathing Dust</td>
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<tr>
<td>Wear Assigned Protective Equipment</td>
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<tr>
<td>Do Not Remain in Area Unless Your Work Requires It</td>
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<tr>
<td>Breathing Asbestos Dust May be Hazardous to Your Health</td>
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Spacing between lines shall be at least equal to the height of the upper of any two lines.

(2) Caution Labels

(i) Labeling. Caution labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers, except that no label is required where asbestos fibers have been modified by a bonding agent, coating, binder, or other material so that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section will be released.
(ii) Label specifications. The caution labels required by subdivision (i) of this subparagraph shall be printed in letters of sufficient size and contrast as to be readily visible and legible. The label shall state:

CAUTION
Contains Asbestos Fibers
Avoid creating Dust
Breathing Asbestos Dust May Cause
Serious Bodily Harm

(h) HOUSEKEEPING

(1) Cleaning. All external surfaces in any place of employment shall be maintained free of accumulations of asbestos fibers if, with their dispersion, there would be an excessive concentration.

(2) Waste disposal. Asbestos waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated clothing, consigned for disposal, which may produce in any reasonably foreseeable use, handling, storage, processing, disposal or transportation airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section shall be collected and disposed of in sealed impermeable bags, or other closed, impermeable containers.

(i) Recordkeeping

(1) Exposure records. Every employer shall maintain records of any personal or environmental monitoring required by this section. Records shall be maintained for a period of at least 20 years and shall be made available upon request to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of the National Institute for Occupational Safety and Health, and to authorized representatives of either.

(2) Employee access. Every employee and former employee shall have reasonable access to any record required to be maintained by subparagraph (1) of this paragraph, which indicates the employee's own exposure to asbestos fibers.

(3) Employee notification. Any employee found to have been exposed at any time to airborne concentrations of asbestos fibers in excess of the limits prescribed in paragraph (b) of this section shall be notified in writing of the exposure as soon as practicable but not later than 5 days of the finding. The employee shall also be timely notified of the corrective action being taken.

(j) MEDICAL EXAMINATIONS

(1) General. The employer shall provide or make available at his cost, medical examinations relative to exposure to asbestos required by this paragraph.
(2) Preplacement. The employer shall provide or make available to each of his employees, within 30 calendar days following his first employment in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination, which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV 1.0).

(3) Annual examinations. On or before January 31, 1973, and at least annually thereafter, every employer shall provide, or make available, comprehensive medical examinations to each of his employees engaged in occupations exposed to airborne concentrations of asbestos fibers. Such annual examination shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV 1.0).

(4) Termination of employment. The employer shall provide, or make available, within 30 calendar days before or after the termination of employment of any employee engaged in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV 1.0).

(5) Recent examinations. No medical examination is required of any employee, if adequate records show that the employee has been examined in accordance with this paragraph within the past 1-year period.

(6) Medical records.

(i) Maintenance. Employers of employees examined pursuant to this paragraph shall cause to be maintained complete and accurate records of all such medical examinations. Records shall be retained by employers for at least 20 years.

(ii) Access. Records of the medical examinations required by this paragraph shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.20(a)-(e) and (g)-(i). These records shall also be provided upon the request to the Director of NIOSH. Any physician who conducts a medical examination required by this paragraph shall furnish to the employer of the examined employee all the information specifically required by this paragraph, and any other medical information related to occupational exposure to asbestos fibers.
APPENDIX D

OSHA's Respiratory Protection Standard
(29 CFR 1910.134)
OCCUPATIONAL SAFETY AND HEALTH STANDARDS
SUBPART I — PERSONAL PROTECTIVE EQUIPMENT


Subpart I — Personal Protective Equipment

§ 1910.132 General requirements.

(a) Application. Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

(b) Employee-owned equipment. Where employees provide their own protective equipment, the employer shall be responsible to assure its adequacy, including maintenance, and sanitation of such equipment.

(c) Design. All personal protective equipment shall be of safe design and construction for the work to be performed.

§ 1910.133 Eye and face protection.

(a) General. (1) Protective eye and face equipment shall be required where there is a reasonable probability of injury that can be prevented by such equipment. In such cases, employers shall make conveniently available a type of protective equipment suitable for the work to be performed, and employees shall use such protectors. No unprotected person shall knowingly be subjected to a hazardous environmental condition. Suitable eye protectors shall be provided where machines or operations present the hazard of flying objects, glare, liquids, injurious radiation, or a combination of these hazards.

(2) Protectors shall meet the following minimum requirements:

(i) They shall provide adequate protection against the particular hazards for which they are designed.

(ii) They shall be reasonably comfortable when worn under the designated conditions.

(iii) They shall fit snugly and shall not unduly interfere with the movements of the wearer.

(iv) They shall be durable.

(v) They shall be capable of being disinfected.

(vi) They shall be easily cleanable.

(vii) Protectors should be kept clean and in good repair.

(b) Design, constriction, testing, and substitution of less toxic materials. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to the following requirements.

(1) Respirators shall be provided by the employer when such equipment is necessary to protect the health of the employee. The employer shall provide the respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protective program which shall include the requirements outlined in paragraph (b) of this section.

(2) The employee shall use the provided respiratory protection in accordance with instructions and training received.

(b) Requirements for a minimal acceptable program. (1) Written standard operating procedures governing the collection, and use of respirators shall be established.

(2) Respirators shall be selected on the basis of hazards to which the worker is exposed.

(3) The user shall be instructed and trained in the proper use of respirators and their limitations.

(4) Where practicable, the respirators should be assigned to individual workers for their exclusive use.

(5) Respirators shall be regularly cleaned and disinfected. Those issued for
the exclusive use of one worker should be cleared after each day's use, or more often if necessary. These used air compressors shall be thoroughly cleaned and disinfected after each use.

(6) Respirators shall be stored in a convenient, clean, and sanitary location.

(7) Respirators used routinely shall be inspected during cleaning. Worn or deteriorated parts shall be replaced. Respirators for emergency use such as self-contained devices shall be thoroughly inspected at least once a month and after each use.

(8) Appropriate surveillance of work area conditions and degree of employee exposure or stress shall be maintained.

(9) There shall be regular inspection and evaluation to determine the continued effectiveness of the program.

(10) Persons should be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The local physician shall determine what health and physical conditions are necessary. Each respirator user's medical status should be reviewed periodically (for instance, annually).

(11) Approved or accepted respirators shall be used when they are available. The respirator furnished shall provide adequate respiratory protection against the particular hazard for which it is designed in accordance with standards established by competent authorities. The U.S. Department of Interior, Bureau of Mines, and the U.S. Department of Agriculture are recognized as such authorities. Although respirators listed by the U.S. Department of Agriculture for use in stabilizing or applying pesticides, the U.S. Department of the Interior, Bureau of Mines, is the agency now responsible for testing and approving respirators.

(c) Selection of respirators. Proper selection of respirators shall be made according to the guidance of American National Standard Practices for Respiratory Protection.

(1) Compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration shall be of high purity. Oxygen shall meet the requirements of the specification for Grade D breathing air as described in Compressed Gas Association Commodity Specification G-7.1-1966. Compressed oxygen shall not be used in supplied-air respirators or in open circuit self-contained breathing apparatus that have previously used compressed air. Oxygen must never be used with line respirators.

(2) Breathing air may be supplied to respirators from cylinders or air compressors

(i) Cylinders shall be tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR Part 178).

(ii) The compressor for supplying air shall be equipped with necessary safety and standby devices. A breathing air-type compressor shall be used. Compressors shall be constructed and situated so that there shall be no risk of air entering the system and being suitable in line air purifying sorbent beds and filters installed to further assure breathing air quality. A receiver of sufficient capacity to permit the compressor to escape from a contaminated atmosphere in event of compressor failure, and alarms to indicate compressor failure and overheating shall be installed in the system. If the compressor is used, it shall have a high-temperature or carbon monoxide alarm, or both. If only a high-temperature alarm is used, the air from the compressor shall be frequently tested for carbon monoxide to insure that it meets the specifications in subparagraph (1) of this paragraph.

(3) Air line couplings shall be incompatible with outlets on other systems to prevent inadvertent servicing of air line respirators with nonrespirable gases or oxygen.


(e) Use of respirators. (1) Standard procedures shall be developed for respirator use. These should include all information and guidance necessary for their proper selection, use, and care. Possible dangers in and around respirators should be anticipated and planned for.

(2) The correct respirator shall be specified for each job. The respirator type is usually specified in the work procedures by a qualified individual supervising the respiratory protective program. The individual issuing them shall be adequately instructed to ensure that the correct respirator is issued. Each respirator permanently assigned to an individual should be durably marked to indicate to whom it was assigned. This mark shall not affect the respirator performance in any way. The date of issuance should be recorded.

(3) Written procedures shall be prepared covering safe use of respirators in dangerous atmospheres that might be encountered in normal operations or in emergencies. Personnel should be familiar with these procedures and the available respirators.

(i) In areas where the wearer, with failure of the respirator, could be overcome by a toxic or oxygen-deficient atmosphere, at least one additional man shall be present. Communications visual, voice, or signal line shall be maintained between both or all individuals present. Planning shall be such that one individual will be unaffected by any likely incidents and have the proper rescue equipment to be able to assist another in case of emergency.

(ii) When self-contained breathing apparatus or hose masks with blowers are used in atmospheres immediately dangerous to life or health, standby men shall be present with suitable rescue equipment.

(iii) Persons using air line respirators in atmospheres immediately hazardous to life or health shall be equipped with safety harnesses and safety lines for lifting or removing persons from hazardous atmospheres or other and equivalent provisions of the rescue of persons from hazardous atmospheres shall continue. A standby man or men with suitable self-contained breathing apparatus shall be at the nearest fresh air base for emergency rescue.

(4) Respiratory protection is no better than the respirator in use, even though its breathing apparatus in a test atmosphere.

(5) Persons responsible for respirators shall be so instructed by competent persons. Training shall provide the men an opportunity to handle the respirator, to fit, test its facepiece, and be taught the proper use and care. Both supervisors and workers shall be so instructed by competent persons.

(e) Use of respirators. (1) Standard procedures shall be developed for respirator use. These should include all information and guidance necessary for their proper selection, use, and care. Possible dangers in and around respirators should be anticipated and planned for.

(2) The correct respirator shall be specified for each job. The respirator type is usually specified in the work procedures by a qualified individual supervising the respiratory protective program. The individual issuing them shall be adequately instructed to ensure that the correct respirator is issued. Each respirator permanently assigned to an individual should be durably marked to indicate to whom it was assigned. This mark shall not affect the respirator performance in any way. The date of issuance should be recorded.

(3) Written procedures shall be prepared covering safe use of respirators in dangerous atmospheres that might be encountered in normal operations or in emergencies. Personnel should be familiar with these procedures and the available respirators.

(i) In areas where the wearer, with failure of the respirator, could be overcome by a toxic or oxygen-deficient atmosphere, at least one additional man shall be present. Communications visual, voice, or signal line shall be maintained between both or all individuals present. Planning shall be such that one individual will be unaffected by any likely incidents and have the proper rescue equipment to be able to assist another in case of emergency.

(ii) When self-contained breathing apparatus or hose masks with blowers are used in atmospheres immediately dangerous to life or health, standby men shall be present with suitable rescue equipment.

(iii) Persons using air line respirators in atmospheres immediately hazardous to life or health shall be equipped with safety harnesses and safety lines for lifting or removing persons from hazardous atmospheres or other and equivalent provisions for the rescue of persons from hazardous atmospheres shall continue. A standby man or men with suitable self-contained breathing apparatus shall be at the nearest fresh air base for emergency rescue.

(4) Respiratory protection is no better than the respirator in use, even though it is worn conscientiously. Frequent random inspections shall be conducted by a qualified individual to ensure that the respirators are clean, used, cleaned, and maintained.

(5) For safe use of any respirator, it is essential that the user be properly instructed in its selection, use, and maintenance. Both supervisors and workers shall be so instructed by competent persons. Training shall provide the men an opportunity to handle the respirator, to fit, test its facepiece, and be taught the proper use and care. Both supervisors and workers shall be so instructed by competent persons.

(6) Maintenance and care of respirators. (1) A program for maintenance and
care of respirators shall be adjusted to the type of work, working conditions, and hazards involved, and shall include the following basic services:

(1) Inspection for defects (including a leak check).
(2) Cleaning and disinfecting.
(3) Repair.
(4) Storage.

Equipment shall be properly maintained to retain its original effectiveness.

(i) Respirators shall be inspected routinely before and after each use. A respirator that is not routinely used but is kept ready for emergency use shall be inspected after each use and at least monthly, to ensure that it is in satisfactory working condition.

(ii) Self-contained breathing apparatus shall be inspected monthly. Air and oxygen cylinders shall be fully charged and maintained for emergency use.

(iii) Instructions for proper storage of emergency respirators, such as gas masks and self-contained breathing apparatus, are found in "use and care" instructions usually mounted inside the carrying case lid.

(iv) Identification of gas mask canisters. (1) The primary means of identifying a gas mask respirator shall be by means of properly worded labels. The secondary means of identifying a gas mask canister shall be by a color code.

(v) All who issue or use gas masks falling within the scope of this section shall see that all gas mask respirators purchased or used by them are properly labeled and colored in accordance with these recommendations before they are placed in service and that the labels and colors are properly maintained at all times thereafter until the canisters have completely served their purpose.

(vi) On each canister shall appear in bold letters the following:

(1) Canister for

Type N Gas Mask Canister

In addition, essentially the following wording shall appear beneath the appropriate phrase on the canister label: "For respiratory protection in atmospheres containing not more than percent by volume of...

(2) Name of atmospheric contaminant)

(iii) Revoked

(4) Canisters having a special high-efficiency filter for protection against radionuclides and other highly toxic particulates shall be labeled with a statement of the type and degree of protection afforded by the filter. The label shall be affixed to the neck end of, or to the gray stripe which is around and near the top of, the canister. The degree of protection shall be marked as the percent of penetration of the canister by a 0.3-micron-diameter diocetyl phthalate (DOP) smoke at a flow rate of 83 liters per minute.

(5) Each canister shall have a label warning that gas masks should be used only in atmospheres containing sufficient oxygen to support life (at least 16 percent by volume), since gas mask canisters are only designed to neutralize or remove contaminants from the air.

(6) Each gas mask canister shall be painted a distinctive color or combination of colors indicated in Table I-1. All colors used shall be such that they are clearly identifiable by the user and clearly distinguishable from one another.

Color coating shall offer a high degree of resistance to chipping, scaling, peeling, blistering, and the effects of the ordinary atmospheres to which they may be exposed under normal conditions of storage and use. Appropriately colored pressure sensitive tape may be used for the stripes.


### Table I-1: Atmospheric contaminants to be protected against

<table>
<thead>
<tr>
<th>Atmospheric Contaminants to be Protected Against</th>
<th>Colors Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid gases</td>
<td>White</td>
</tr>
<tr>
<td>Hydrocyanic acid gas</td>
<td>White with 1/8-inch green stripe completely around the canister near the bottom.</td>
</tr>
<tr>
<td>Chlorine gas</td>
<td>White with 1/8-inch green stripe completely around the canister near the bottom.</td>
</tr>
<tr>
<td>Organic vapors</td>
<td>White with 1/8-inch white stripe completely around the canister near the bottom.</td>
</tr>
<tr>
<td>Ammonia gas</td>
<td>Black</td>
</tr>
<tr>
<td>Acid gases and ammonia gas</td>
<td>Green</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>Green with 1/8-inch yellow stripe completely around the canister near the bottom.</td>
</tr>
<tr>
<td>Acid gases and organic vapors</td>
<td>Yellow</td>
</tr>
<tr>
<td>Hydrocyanic acid gas</td>
<td>Yellow with 1/8-inch yellow stripe completely around the canister near the bottom.</td>
</tr>
<tr>
<td>Acid gases, organic vapors, and ammonia gases</td>
<td>Purple (Magenta)</td>
</tr>
<tr>
<td>Radioactive materials, excepting tritium and noble gases.</td>
<td>Canister color for contaminant, as designated above.</td>
</tr>
<tr>
<td>Particulates (dusts, fumes, mists, fogs, or smoke) in combination with any of the above gases or vapors.</td>
<td>Red with 1/8-inch gray stripe completely around the canister near the top.</td>
</tr>
<tr>
<td>All of the above atmospheric contaminates</td>
<td>Black.</td>
</tr>
</tbody>
</table>

*Gray shall not be assigned as the main color for a canister designed to remove acids or vapors.

Note: Orange shall be used as a complete body, or stripe color to represent gases not included in this table. The user will need to refer to the canister label to determine the degree of protection the canister will afford.
§ 1910.135 Occupational head protection.

Helmets for the protection of heads of occupational workers from impact and penetration from falling and flying objects and from limited electric shock and burn shall meet the requirements and specifications established in American National Standard Safety Requirements for Industrial Head Protection, Z89.1-1969.

§ 1910.136 Occupational foot protection.

Safety-toe footwear for employees shall meet the requirements and specifications in American National Standard for Men's Safety-Toe Footwear, Z41.1-1967.

§ 1910.137 Electrical protective devices.

Rubber protective equipment for electrical workers shall conform to the requirements established in the American National Standards Institute Standards specified in the following list:

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubber insulating blankets</td>
<td>J6.4-1970.</td>
</tr>
<tr>
<td>Rubber insulating hoods</td>
<td>J6.2-1950 (R1962)</td>
</tr>
<tr>
<td>Rubber insulating line hose</td>
<td>J6.1-1950 (R1962)</td>
</tr>
<tr>
<td>Rubber insulating sleeves</td>
<td>J6.5-1962.</td>
</tr>
</tbody>
</table>

§ 1910.138 Effective dates.

(a) The provisions of this Subpart I shall become effective on August 27, 1971, except that:

1. Any provision in any other section of this subpart which contains in itself a specific effective date or time limitation shall become effective on such date or shall apply in accordance with such limitation; and

2. If any standard in 41 CFR Part 50-204, other than a national consensus standard incorporated by reference in § 50-204.2(a)(1), is or becomes applicable at any time to any employment and place of employment, by virtue of the Walsh-Healey Public Contracts Act, or the Service Contract Act of 1965, or the National Foundation on Arts and Humanities Act of 1965, any corresponding established Federal standard in this Subpart I which is derived from 41 CFR Part 50-204 shall also become effective, and shall be applicable to such employment and place of employment, on the same date.

§ 1910.139 Sources of standards.

Sec. Source
1910.132 41 CFR 50-204.7.

§ 1910.140 Standards organizations.

Specific standards of the following organization have been referenced in this part. Copies of the referenced materials may be obtained from the issuing organization.

American National Standards Institute, 1430 Broadway, New York, NY 10018.