



Designation: E1368 – 05<sup>ε1</sup>

## Standard Practice for Visual Inspection of Asbestos Abatement Projects<sup>1</sup>

This standard is issued under the fixed designation E1368; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

<sup>ε1</sup> NOTE—Asbestos warning editorially added in June 2006.

### 1. Scope

1.1 This practice covers procedures for performing visual inspections of asbestos response actions to:

1.1.1 Establish the extent of the required work before it begins;

1.1.2 Determine the progress and quality of the work and evaluate the completeness of the response action; and

1.1.3 Evaluate the cleanliness of the work area prior to final air testing for clearance (if performed), and subsequent to dismantling of critical barriers.

1.2 This practice can be used on an abatement project, or for operations and maintenance (O&M) work, performed by the building owner's staff. It can also be used in conjunction with contract documents between the building owner and other parties involved in an abatement project.

NOTE 1—Standard contract documents (such as AIA and EJCDC documents) define contractual relationships and responsibilities for projects within the construction industry. Asbestos abatement projects differ from traditional construction projects in the manner of their design and execution, as well as in the type and level of oversight required to substantiate their successful completion. Non-traditional responsibilities are given to the building owner, project designer, and abatement contractor by this practice. Furthermore, responsibilities related to project oversight, inspections, and approvals are placed upon an additional non-traditional representative of the building owner; the project monitor, as defined by this practice. All parties are cautioned that the subject authorities and corresponding responsibilities be understood, mutually agreed upon, and correspondingly addressed with appropriate modifications, if necessary, to the contract documents for a specific project.

1.3 This practice provides the following information:

1.3.1 The objectives of the visual inspection process;

1.3.2 The responsibilities and qualifications of the individuals involved in the visual inspections;

1.3.3 The schedule of visual inspection activities during an abatement project and O&M work;

1.3.4 The inspection procedures for the various types of abatement work and O&M tasks; and

1.3.5 The criteria for certifying work as complete on the basis of the visual inspections.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 **Warning**—Asbestos fibers are acknowledged carcinogens. Breathing asbestos fibers can result in disease of the lungs including asbestosis, lung cancer, and mesothelioma. Precautions in this standard practice should be taken to avoid creating and breathing airborne asbestos particles from materials known or suspected to contain asbestos. See 2.2 for regulatory requirements addressing asbestos.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific safety statements, see 12.2.

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>2</sup>

E631 Terminology of Building Constructions

E736 Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members

E1494 Practice for Encapsulants for Spray- or Trowel-Applied Friable Asbestos-Containing Building Materials

E2356 Practice for Comprehensive Building Asbestos Surveys

E2394 Practice for Maintenance, Renovation and Repair of Installed Asbestos Cement Products

#### 2.2 Other Documents:

EPA 560/5-85-024 Guidance for Controlling Asbestos-Containing Materials in Buildings<sup>3</sup>

EPA 20T-2003 Managing Asbestos in Place: A Building Owner's Guide to Operations and Maintenance Programs

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee E06 on Performance of Building Constructions and is the direct responsibility of Subcommittee E06.24 on Building Preservation and Rehabilitation Technology.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401.

- for Asbestos-Containing Materials<sup>3</sup>
- 40 CFR Part 61 National Emission Standards for Hazardous Air Pollutants: Subpart M—Asbestos<sup>3</sup>
- 40 CFR Part 763 Asbestos-Containing Materials in Schools and Model Accreditation Plan (EPA AHERA Regulations)<sup>3</sup>
- 29 CFR 1910.1001 Occupational Exposure to Asbestos (OSHA General Industry Standard)<sup>3</sup>
- 29 CFR 1915.1001 Occupational Exposure to Asbestos (OSHA Shipyard Standard)<sup>3</sup>
- 29 CFR 1926.1101 Occupational Exposure to Asbestos (OSHA Construction Standard)<sup>3</sup>
- Guidance Manual:** Asbestos Operations and Maintenance Work Practices<sup>4</sup>
- Asbestos Abatement and Management in Buildings: Model Guide Specification<sup>4</sup>

### 3. Terminology

3.1 *Definitions*—For definitions of building terms, see Terminology E631.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *asbestos-containing materials*—material containing more than one percent asbestos.

3.2.1.1 *miscellaneous materials, n*—material, other than surfacing material and thermal system insulation, on interior and exterior structural, mechanical, electrical, or architectural components and surfaces. Miscellaneous material includes, but is not limited to, ceiling tiles, gaskets, floor coverings and mastics, wallboard joint compound, roofing materials, and cementitious products.

3.2.1.2 *surfacing material, n*—material that is sprayed, troweled-on, or otherwise applied to interior and exterior structural and architectural surfaces. Surfacing material includes acoustical plaster on ceilings, fireproofing on structural members, textured paint and exterior stucco, and other materials applied to surfaces for acoustical, decorative, fireproofing, and other purposes.

3.2.1.3 *thermal system insulation, n*—material which is applied to interior and exterior mechanical components to reduce heat gain or loss. Thermal system insulation includes insulation on pipes, fittings, boilers, breeching, tanks, ducts, and other mechanical components.

3.2.2 *building asbestos survey, n*—an activity to determine the presence, location, or condition of asbestos-containing materials in a building.

3.2.3 *clean room, n*—an uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

3.2.4 *competent person, n*—one who is capable of identifying existing asbestos hazards in the workplace and who has the authority to take prompt corrective measures to eliminate them.

3.2.5 *contract documents, n*—the specifications, drawings, terms and conditions, general provisions, and other components of the agreement between the building owner and the contractor.

3.2.6 *crawl space, n*—an accessible area that may have a dirt floor, usually with low head room.

3.2.7 *critical barriers, n*—one or more layers of rigidly-supported plastic sheeting sealed over all openings into an asbestos work area (with the exception of make-up air provisions and means of entry and exit), designed to prevent airborne asbestos fibers or asbestos-contaminated water from migrating to an adjacent area.

3.2.8 *decontamination area, n*—an enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment contaminated with asbestos.

3.2.9 *dust and debris, n*—visible particles, fragments, or chunks of material, large enough to have settled in the work area by virtue of their weight, that are presumed to have originated from the material abated by the response action, or from a fiber release episode.

3.2.10 *encapsulant, n*—for friable asbestos-containing materials, a material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent release of fibers.

3.2.10.1 *bridging encapsulant, n*—an encapsulant that forms a discrete layer on the surface of an in-situ asbestos matrix.

3.2.10.2 *penetrating encapsulant, n*—an encapsulant that is absorbed by an in-situ asbestos matrix without leaving a discrete surface layer.

3.2.11 *enclosure, n*—(1) a rigid, air-tight barrier constructed around an asbestos-covered component or structural element to protect the asbestos material from impact and to contain any release of asbestos fibers. (2) a space, within which asbestos abatement operations are performed, whose limits are defined by rigid or non-rigid barriers for the purpose of controlling access and limiting fiber escape.

3.2.12 *fiber release episode, n*—uncontrolled or unintentional disturbance of asbestos-containing materials which results in the generation of dust and debris.

3.2.13 *friable material, n*—material easily crumbled or powdered by moderate (hand) pressure.

3.2.14 *glovebag, n*—a nominally 6-mil minimum thickness transparent polyethylene or poly(vinyl chloride) plastic bag with inward projecting longsleeve gloves, designed to enclose an object from which an asbestos-containing material is to be removed.

3.2.15 *high efficiency particulate air (HEPA) filter, n*—the final stage filter on a negative pressure ventilation device (see 3.2.19) or on a vacuum cleaner.

3.2.16 *industrial hygienist, n*—a professional trained in the health and physical sciences who is qualified to recognize, evaluate, and monitor potential occupational and environmental exposures to hazardous materials, and to formulate measures for their control.

3.2.17 *load-out area, n*—a structure attached to, but not within, the abatement area into which containers of removed material are passed and stored for subsequent transfer to a truck for disposal.

3.2.18 *mini-enclosure, n*—an enclosure as defined in 3.2.11 (2), consisting of a change room and work room (no shower),

<sup>4</sup> Available from National Institute of Building Sciences (NIBS), 1090 Vermont Avenue, NW, Suite 700 Washington, DC 20005-4905.

that is large enough for one or two workers, is under negative pressure by a HEPA-filtered exhaust device, and is used for a relatively short period of time.

3.2.19 *negative pressure, n*—slightly reduced pressure within the work area, relative to the space outside the work area, to prevent leakage of contaminated air from the work area.

3.2.20 *pre-bid conference, n*—a meeting held at the job site to discuss and clarify contract requirements and allow prospective bidders to view the work.

3.2.21 *project monitor, n*—the building owner’s representative who observes abatement activities performed by contractors to ensure that abatement work is completed according to specifications and in compliance with all relevant statutes and regulations.

3.2.22 *regulated area, n*—an area established by the employer to demarcate areas where airborne concentrations of asbestos exceed or can reasonably be expected to exceed the permissible exposure limit.

3.2.23 *residue, n*—visible material which remains on the abated surface due to incomplete removal and cleaning.

3.2.24 *response action, n*—a method of abatement (such as removal, encapsulation, or enclosure) or operations and maintenance (such as repair, clean-up, or preventive measures) of asbestos-containing material in any form, for any purpose whatsoever.

3.2.25 *sealer, n*—material applied to a pipe or substrate after completion of the final cleaning operation to bond unremoved fiber residue to the pipe or substrate, that is compatible with intended retrofit requirements and operating temperature conditions.

3.2.26 *testing laboratory, n*—a laboratory that determines (1) airborne fiber concentrations from air sample filters, and (2) the amount and type of asbestos in bulk samples.

3.2.27 *unremoved material, n*—any material which was required to be removed by a response action but remains substantially undisturbed.

3.2.28 *visual inspection process, n*—the activities before, during, and at the conclusion of a response action that are associated with detecting the presence of visible residue, dust and debris, or unremoved material and verifying the absence thereof at the completion of a response action.

#### 4. Summary of Practice

4.1 Visual inspection of asbestos abatement projects is an important process in determining whether the work has been acceptably performed. The owner representative(s) must be involved throughout the entire process, the success of which depends on the cooperation of all participants.

4.1.1 The visual inspection process begins at the earliest stages of planning and continues through completion of the work.

4.1.2 The fundamental criterion for completeness of removal and clean-up is the absence of visible residue, dust and debris, and unremoved material. General refinements of this criterion are set forth in this practice, and the visual inspection procedures and criteria applicable to a specific project must be clearly stated in the contract documents.

4.1.3 Protective measures, including critical barriers and enclosures, decontamination chambers, protective clothing, and respirators, must remain in effect until visual inspection is completed and final air testing for clearance meets the provisions in the specification.

4.2 Visual inspection of O&M work is an important process in determining whether the work has been acceptably performed. Visual inspection of O&M work is critical in the absence of other controls for fiber release, such as negative pressure, particularly if air testing for clearance will not be performed.

4.3 Visual inspection is only one component of a complex set of procedures involved in asbestos abatement or O&M work. Consultation of reference materials and publications, including the *ASTM Manual on Asbestos Control*,<sup>5</sup> is suggested for orientation to the broader aspects of asbestos control.

#### 5. Significance and Use

5.1 This practice applies to response actions for all types of asbestos-containing materials, including surfacing materials, thermal systems insulation, and miscellaneous materials, whether friable or not, regardless of the quantities involved and the reason for conducting the response action.

5.1.1 Abatement for the purpose of removing asbestos-containing materials or encapsulating or enclosing them, regardless of the engineering controls and work practices used, requires performance of visual inspections as described in this practice.

5.1.2 Operations and maintenance activities, such as removal, encapsulation, or enclosure of asbestos-containing materials incidental to repair or replacement of a component, clean-up of debris from a fiber release episode, or other preventive measures, require the performance of visual inspections as described in this practice. See [EPA 20T-2003](#) and *Guidance Manual: Asbestos Operations and Maintenance Work Practices*.

5.1.3 This practice applies to response actions performed under a contract from the building owner, as well as to work performed by the building owner’s staff.

5.2 The specific objectives of the visual inspection process before, during, and at the conclusion of an asbestos abatement project are: to review the extent of asbestos-containing material (ACM) within the scope of work, to monitor performance of the work, and to verify if visible residue, dust or debris, or unremoved material are absent at the completion of removal and clean-up activities.

5.2.1 The visual inspection process is used to evaluate all four aspects of an asbestos abatement project as follows:

5.2.1.1 *Extent of ACM within Scope of Work*—The building survey which is intended to locate and quantify asbestos-containing materials is not properly called a “visual inspection” within the context of this practice. To define the extent of ACM involved, a building survey is a necessary prelude to the first step of the visual inspection process. The building survey, which may use other building records, is intended to locate and

<sup>5</sup> *ASTM Manual on Asbestos Control: Removal, Management, and the Visual Inspection Process*, Manual No. 23, ASTM, West Conshohocken, PA, March 2005.

assess the condition of ACM with confirmation by laboratory analysis of bulk samples. Additional surveys may be required during project design to find ACM in locations not entered or accessible during the initial building survey. The extent of the ACM to be abated must be known in order to properly design the abatement project. See [40 CFR Part 61](#).

5.2.1.2 *Project Work Performance*—Observation of work activities throughout the abatement project confirms acceptable work performance and aids the visual inspection for completeness of removal of ACM from the surfaces and components and for completeness of cleanup of the work area. Careful examination of the work area may be required at the start of the project for debris that may have been generated after the building surveys and project design.

5.2.1.3 *Completeness of Abatement*—The presence of residue, visible without the use of magnifying devices, on surfaces and components from which asbestos has been removed indicates that additional cleaning of these surfaces is required. All ACM required to be removed by the contract documents must be gone in order to pass the inspection for completeness of removal. Similarly, the presence of improperly encapsulated or insufficiently enclosed material indicates that these measures, if used for abatement or as an adjunct thereto, were inadequately performed and corrective action shall be taken.

5.2.1.4 *Completeness of Clean-up*—The presence of dust or debris on surfaces in areas where abatement has taken place indicates that these areas were not properly cleaned following the abatement. Final air samples for clearance and re-occupancy shall not be taken until the visual inspection for completeness of clean-up is passed.

5.2.2 Visual inspection is not a substitute for air monitoring at any stage of the work and is particularly not a substitute for final air testing for building re-occupancy following an asbestos abatement project. The basic premise of this practice is that a surface, component, or work area where residue, dust or debris, or unremoved material, visible without the use of magnifying devices, is still present is not sufficiently clean for subsequent stages of work. Any residue, dust, or debris found during the inspections is assumed to contain asbestos, and the surfaces, components, and area must be re-cleaned before proceeding further.

5.2.3 Passing the visual inspections for completeness of abatement and clean-up improves the chances, but does not guarantee, that the area will pass final air testing for clearance.

5.3 Visual inspection is an important means of determining acceptable completion of operations and maintenance work. The objectives of the visual inspection process as it applies to O&M work are similar to those for abatement projects with specific procedures and acceptance criteria that recognize the following aspects of O&M activities:

5.3.1 Operations and maintenance work is generally more brief than abatement projects, involves less ACM, and is consequently referred to as “small-scale, short-duration” in Appendix B to [40 CFR Part 763 \(EPA AHERA regulations\)](#). Permissible quantities and operations may vary according to applicable regulations and are not specified in this practice.

5.3.2 Operations and maintenance work often lacks such protective measures as negative pressure and decontamination

facilities that provide protection to workers and building occupants during abatement projects.

## 6. Qualifications

6.1 The following credentials are evidence of the ability to perform the visual inspections as described in this practice:

6.1.1 Credentials that indicate knowledge of building design include the following:

6.1.1.1 Experience in building design, construction, or operations;

6.1.1.2 Classroom training as an AHERA-accredited project monitor or project designer; and

6.1.1.3 Academic degree(s), licensure or registration as an architect or engineer, or both.

6.1.2 Credentials that indicate knowledge of building construction and operations include the following:

6.1.2.1 Field experience in building construction, renovation, demolition, or maintenance, or combination thereof;

6.1.2.2 Classroom training as an AHERA-accredited project designer or supervisor; and

6.1.2.3 Formal or on-the-job training in construction technology or management, with particular emphasis on communications with construction supervisors and workers.

6.1.3 Credentials that indicate familiarity or expertise in asbestos abatement and O&M techniques include the following:

6.1.3.1 Training as an AHERA-accredited supervisor or project designer, or completing an O&M training course;

6.1.3.2 Field experience in asbestos abatement project surveillance, provided that such experience includes inspections as described in this practice and is not limited to air monitoring; and

6.1.3.3 Academic degree(s) or certification in industrial hygiene, or both, with experience that includes inspections as described in this practice and is not limited to air monitoring.

6.1.4 Credentials that indicate familiarity or expertise with suspected ACM and its substrates include training as an AHERA-accredited project monitor and field experience in performing asbestos building surveys.

6.2 Accreditation as an AHERA asbestos project monitor is a desirable credential. However, neither this practice nor the EPA Model Accreditation Plan requires accreditation to perform visual inspections for completion of response actions.

6.3 Completion of the ASTM Technical and Professional Training course *Standards for Asbestos Control* may be accepted as evidence of appropriate training to perform visual inspections, but does not substitute for asbestos abatement project field experience.

6.4 Completion of a project monitor course as described in the EPA Model Accreditation Plan may be accepted as evidence of appropriate training to perform visual inspections, but does not substitute for asbestos abatement project field experience.

6.5 Performing visual inspections involves physical activity and requires visual acuity. The absence of physical and vision limitations that might compromise the inspection may be considered a prerequisite for performing the duties of the project monitor.

## 7. Responsibilities of Abatement Project Participants

7.1 During an abatement project the participants include the building owner, the owner's representative(s), and the abatement contractor. Their responsibilities vary and are detailed below.

### 7.2 *Building Owner:*

7.2.1 The building owner who is responsible for an asbestos abatement project large enough to involve a contract for the service will often hire an experienced and competent consultant, such as an architect, construction engineer, or industrial hygienist, to act as the owner's representative.

7.2.2 The responsibilities of the consultant retained by the building owner shall be mutually agreed upon and shall include the items in 7.3.

7.2.3 If the building owner is directly monitoring the work of the abatement contractor, the building owner is responsible for performing the visual inspection or ensuring that the visual inspection is performed by others in accordance with the contract documents. If a consultant is retained to prepare the contract documents and enforce their implementation, the consultant is responsible, even though he may have delegated the visual inspection functions to others.

7.2.4 If anyone other than the building owner has the authority to stop the contractor from removing asbestos-containing material and require the contractor to correct violations of the specification or regulations, this must be clearly stated in the contract documents. The building owner retains the final responsibility for accepting the performance of the work done by the contractor and all others employed on the project.

7.3 *Owner's Representative(s)*—The owner may have various people helping him complete an abatement project, and this section discusses four of them: the consultant, project designer, project monitor, and accredited inspector.

7.3.1 At the beginning of the project, the project designer will prepare contract documents, based on a project design survey according to Practice E2356 to establish the presence and condition of asbestos-containing materials and to provide other information needed for the plans and specifications. The documents should include the procedures for the visual inspections and the degree of cleanliness required as each stage of work is completed and at the conclusion of the project.

7.3.2 During the project, an experienced individual will perform the visual inspections, identify corrective actions needed, and certify when abatement is complete and acceptable visual cleanliness has been achieved. The building owner, or the consultant he has retained for assistance in managing an abatement project, may hire this individual.

7.3.3 The project monitor may be an industrial hygienist, testing laboratory employee, or other individual experienced in asbestos abatement. For small-scale operations, the visual inspections may be performed by a foreman or supervisor.

7.3.4 The project monitor assists the project designer in defining inspection methods and criteria in the contract documents, preferably through the involvement in the building survey. The accredited inspector should, if necessary, collect for analysis representative samples of suspected asbestos

containing materials, including debris or contaminated soil samples from a crawl space that is part of an abatement project.

7.3.4.1 The project monitor should know the testing methods for the encapsulant used, if the project is to involve encapsulation of asbestos-containing materials.

7.3.4.2 The project monitor may have other duties on the project related to air monitoring and project surveillance. For example, as part of prework visual inspections, the project monitor may take air samples to establish background levels of airborne fiber counts in all areas slated for asbestos abatement.

7.3.5 The project monitor must be familiar with the parts of the contract documents for which he is responsible, including:

7.3.5.1 The locations and types of asbestos to be abated and the correct methods to properly carry out the type of abatement involved,

7.3.5.2 The work area isolation methods to control debris accumulation and air sampling procedures to verify their effectiveness,

7.3.5.3 The visual inspection procedures, the techniques for performing them properly, and the schedule of their performance, and

7.3.5.4 The definition of *clean* in the contract specifications or procedure.

7.3.6 The project monitor must be timely with the inspection and analyses (if the project monitor is taking air samples) to expedite the abatement work. The project monitor must be available to report to the job within a reasonable time after notification and must perform the inspection quickly and efficiently without sacrificing thoroughness. To do this, the project monitor must have all of his equipment available and in proper working order at the job site when it is needed.

7.3.7 The project monitor must report work practices not in accordance with the contract documents, citing the applicable page and paragraph number of the document, and also any potential violations of federal and state regulations.

7.3.8 The project monitor is also responsible for regularly advising the building owner or his representative of work progress and of any schedule changes, work problems, or other information obtained from visual inspections.

### 7.4 *Abatement Contractor:*

7.4.1 Unless the building owner is performing the abatement project with his own personnel, an abatement contractor will have been selected for the work.

7.4.2 The abatement contractor has a responsibility contractually to the building owner, and also a responsibility to protect his contractual rights by the following:

7.4.2.1 Performing an inspection immediately prior to beginning work to identify and document any existing contamination or other changes in site conditions. During this inspection, the contractor should be accompanied by the building owner and consultant, or by the project monitor;

7.4.2.2 Performing his own visual inspections of each phase of work, to ensure that the work area is ready for inspection by the owner's representative; and

7.4.2.3 Assisting the project monitor during the inspection and subsequently correcting problems found.

7.4.3 The contractor's competent person (3.2.4), usually a foreman or supervisor, must work closely with the project

monitor and notify the project monitor in a timely manner when an area is ready for inspection. Sufficient time must be provided for cleanup of areas that do not pass the final visual inspection, for resolution of unexpected or difficult situations, and for subsequent reinspection, if required.

7.4.4 The contractor must provide the project monitor with all resources required by the contract documents that are not normally considered the project monitor's "tools of the trade." These resources may include ladders or scaffolds, mechanical scissor lifts, adequate lighting, electrical power, and personnel protection and decontamination provisions. If contractor personnel are to assist with the inspection or to perform concurrent cleaning during the inspection, these personnel and the necessary supplies must be available at the time of inspection.

7.4.5 Ultimately, the caliber of the work performance and the quality of the completed project are the sole responsibility of the contractor, who warrants and guarantees that the finished project fulfills the requirements of the contract documents.

## 8. Visual Inspection Schedule, Procedures and Acceptance Criteria for Abatement Projects

8.1 This section provides a generalized schedule for conducting visual inspections and discusses the various tasks associated with each phase. The project monitor should use the acceptance criteria in this section to determine if abatement work has been satisfactorily completed. The standards of performance to which an abatement contractor will be held must be explicitly stated in the contract documents.

### 8.2 Inspection Prior to the Project:

8.2.1 *Project Design Survey*—A project design survey shall be conducted according to Practice E2356 to determine the location and condition of asbestos-containing materials to be abated and to provide other information for preparation of a complete and accurate set of plans and specifications.

8.2.2 *During Preparation of the Contract Documents*—The building owner should accompany the project designer during the project design survey of the work site to define the limits of the area in which the asbestos hazard is to be abated. Identify existing contamination from previous activities at this time and agree on appropriate action. If encapsulants are to be used, test several on small areas according to Practice E1494 to choose the most effective and to determine post-abatement test methods. This process establishes the depth to which a penetrating encapsulant will be absorbed, and the thickness of the film formed by a bridging encapsulant. If a crawl space is present, inspect the area and take samples of debris and contaminated soil. The procedures for determining the extent to which the crawl space must be free of asbestos at the completion of abatement must be fully and explicitly described.

8.2.2.1 The contract documents should stipulate all procedures and performance measures to which the contractor will be expected to conform, the criteria for visual cleanliness that will be used to judge the quality of work, and a clear description of the methods to be used for inspection. At this time, decide which items are to be removed from the work area by the owner's personnel before the project begins, and which items are to be cleaned and removed by the contractor.

8.2.2.2 Clearly state the sequence of cleanup activities and visual inspections in the contract documents. It is particularly

important to specify the inspections that will be performed before the removal of plastic sheets, decontamination areas, or any isolation barriers that separate work areas from occupied parts of the building.

8.2.3 *During the Pre-Bid Conference*—The project designer and project monitor should attend the pre-bid conference and project walk-through to address questions from bidders on the inspection criteria in the contract documents.

8.2.4 *During the Pre-Construction Activities*—The building owner and project monitor should walk through the work area with the contractor immediately before abatement activities begin in order to verify the current building conditions and changes since the pre-bid conference.

### 8.3 Inspection During the Project:

8.3.1 The project monitor must carry out inspections during the project to confirm that the means and methods of abatement conform to specified procedures. On a large asbestos abatement project, it is likely that work will proceed in phases through several areas. Consider each location isolated from another as an independent area, and inspect it as work is completed. Visual inspection activities must keep pace with the work progress and sequence so that the work in one area does not risk contaminating areas still undergoing preparation, or areas that have already been cleaned, inspected, and released.

#### 8.3.2 Inspections During Abatement:

8.3.2.1 Barriers of plastic sheeting plywood or equivalent materials should isolate the regulated areas, and should be left in place and intact throughout the work period. Closely inspect tears in the plastic floor covering prior to their being mended to see if any debris or water has leaked through to the surface below, particularly if carpeting is underneath. The integrity of the decontamination areas for personnel and equipment must be maintained throughout the work.

8.3.2.2 If the abatement project involves removal, the removed material and contaminated water must not be allowed to accumulate inside the regulated area, but must be bagged or otherwise collected in water-tight containers as soon as practicable. Monitor the perimeter of the regulated area from inside and outside the isolation barriers. If the duct tape sealing the plastic sheeting is allowed to become wet, it may loosen and allow contaminated water and debris to run under the barriers to areas outside the regulated area. Similarly, the decontamination area must be kept strictly clean of any visible dust or debris.

8.3.2.3 Review air monitoring data on a regular basis to measure the effectiveness of barrier integrity. The correlation between any observed debris inside a work area and the airborne fiber counts provides an indication of proper wet removal performance. Air samples collected in the decontamination area and load-out area are effective management tools for enforcing the cleanliness provisions for these spaces and complement the visual inspection effort.

8.3.2.4 Negative pressure ventilation devices should be in continual operations in a regulated area throughout the period of abatement work. Record the readings on negative pressure monitoring devices on a regular or continuous basis for comparison to the required pressure differential.

#### 8.4 Inspection at the Conclusion of the Project: