Designation: E2356 – 18

Standard Practice for Comprehensive Building Asbestos Surveys[1]

This standard is issued under the fixed designation E2356; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice describes procedures for conducting comprehensive surveys of buildings and facilities for the purpose of locating, identifying, quantifying, and assessing asbestos-containing materials.

1.2 The results of a Comprehensive Building Asbestos Survey are intended to be used for ongoing management of asbestos-containing materials, including Operations and Maintenance (O&M), removal, and other response actions. This includes response actions associated with renovations. A Comprehensive Building Asbestos Survey is also intended to provide information required for removal of asbestos-containing materials prior to demolition of a building or facility.

1.3 This practice discusses three types of surveys: Baseline Surveys, Project Design Surveys, and Pre-Construction Surveys.

1.4 This practice discusses the following activities for each of the above types of surveys:

1.4.1 Planning the survey to meet defined objectives;

1.4.2 Obtaining and reviewing information on the building or facility including previous surveys and response actions;

1.4.3 Conducting the physical activities of inspecting the premises and collecting bulk samples of suspect materials;

1.4.4 Analyzing the bulk samples for asbestos type and content;

1.4.5 Assessing the Current Condition and Potential for Disturbance of asbestos-containing materials; and

1.4.6 Preparing a report that includes a narrative discussion of the findings, tabulations of inspection, sampling and analysis results, graphical depiction of the areas inspected, and the results of the assessment.

1.5 This practice does not include air sampling or surface (dust) sampling for purposes of evaluating a potential exposure hazard from airborne asbestos fibers. The reader may find assistance with exposure assessment determination by reviewing Practice D7886.

1.6 **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 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.

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

1.8 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D7521 Test Method for Determination of Asbestos in Soil

D7712 Terminology for Sampling and Analysis of Asbestos

D7886 Practice for Asbestos Exposure Assessments for Repetitive Maintenance and Installation Tasks

E631 Terminology of Building Constructions

E1368 Practice for Visual Inspection of Asbestos Abatement Projects

E1494 Practice for Testing Physical Properties of Friable Surfacing Materials

E2394 Practice for Maintenance, Renovation, and Repair of

[1] This practice is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.07 on Sampling, Analysis, Management of Asbestos, and Other Microscopic Particles.

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[2] 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.

Installed Asbestos Cement Products
MNL-23 Manual on Asbestos Control: Surveys, Assessment, Abatement, and Management – Third Edition, 2015
2.2 *Other Documents:*
29 CFR 1910.134 Respiratory Protection Standard[3]
29 CFR 1910.146 Permit-Required Confined Spaces[3]
29 CFR 1926 Subpart AA Confined Spaces in Construction[3]
29 CFR 1926.1101 Occupational Exposure to Asbestos (OSHA Construction Standard)[3]
40 CFR Part 61 National Emission Standards for Hazardous Air Pollutants: Subpart M—Asbestos[3]
40 CFR Part 763, Appendix E to Subpart E Interim Method of the Determination of Asbestos in Bulk Insulation Samples (Section 1, Section 2 only as applicable), 1987[4]
40 CFR Part 763, Subpart E Asbestos-Containing Materials in Schools (EPA AHERA Regulations)[4]
40 CFR Part 763, Subpart E, Appendix C (EPA Model Accreditation Plan)[4]
EPA 560/5-85-030A Asbestos in Buildings: Simplified Sampling Scheme for Surfacing Materials ("Pink Book"), 1985[4]
EPA 600R-04/004 Research Method for Sampling and Analysis of Fibrous Amphibole in Vermiculite Attic Insulation, January 2004[4]
EPA 600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials, June 1993[4]
Managing Asbestos in Buildings A Guide for Owners and Managers, March 2015[5]
2.3 *ISO Standards:*
ISO/IEC 17025 Testing and Calibration Laboratories[6]

3. Terminology

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

3.2 *Terms Defined in Practice*—The user is referred to Practice E1368 for terms specifically related to asbestos abatement for purposes of a Project Design Survey.

3.2.1 *asbestos-containing materials, n*—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 *crawl space, n*—an accessible area that may have a dirt floor, usually with low head room.

3.2.3 *high efficiency particulate air (HEPA) filter, n*—the final stage filter on a negative pressure ventilation device (see 3.2.19 in Practice E1368)) or on a vacuum cleaner, capable of trapping and retaining at least 99.97 percent of all monodispersed particles of 0.3 micrometres in diameter.

3.2.4 *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.

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

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

3.2.7 *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.

3.2.8 *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.

3.3 *Definitions of Terms Specific to This Standard:*

3.3.1 *accessible location, n*—a functional space or part thereof that can be inspected without requiring destructive testing or presenting an unacceptable health or safety risk to the inspector, and where entry is not prohibited by security or other institutional restrictions.

3.3.2 *building asbestos survey, n*—an activity to determine the presence, location, condition, and quantity of asbestos-containing materials in a building or facility, or on the property containing the building or facility.

3.3.3 *bulk sample, n*—a sample of suspect asbestos-containing material collected for identification of asbestos and determination of the percent of the components in the sample.

3.3.4 *concealed space, n*—a location requiring destructive testing for penetration of a building or component surface for inspection and, if necessary, sampling of suspect material. Concealed spaces include, but are not limited to, cavities inside

[3] Available from Occupational Safety and Health Administration (OSHA), 200 Constitution Ave., NW, Washington, DC 20210, http://www.osha.gov.
[4] Available from United States Environmental Protection Agency (EPA), William Jefferson Clinton Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, http://www.epa.gov.
[5] Available from Environmental Information Association, Inc. (EIA), 6935 Wisconsin Avenue Suite 306 Chevy Chase, MD 20815-6112, https://eia-usa.org.
[6] Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, http://www.iso.org.

soffits, walls and chases, plenums above solid ceilings, subfloor ducts and cable runs, and the interior of HVAC equipment.

3.3.5 *destructive testing, n*—inspection procedures that necessarily involve objectionable or noticeable damage to building surfaces, or require penetration of a surface such as a wall, ceiling, chase, or shaft to gain access to a concealed space. Lifting a ceiling tile or opening a hatch is not destructive testing.

3.3.6 *excluded area, n*—a functional space or part thereof where entry is prohibited by security or other institutional restrictions.

3.3.7 *functional space, n*—an area within a building or facility that is used for a specific purpose. Examples include a warehouse in a manufacturing plant and a conference room in an office building. A functional space can be vertical in extent, such as a pipe chase, and span several floors.

3.3.8 *homogeneous area, n*—surfacing material, thermal system insulation material, or miscellaneous material that is uniform in color and texture and apparent or known date of installation.

3.3.9 *laboratory, n*—an entity that is equipped and qualified to perform one or more of the following analyses, using approved methods: *(1)* identify and quantify asbestos in bulk samples by Polarized Light Microscopy, *(2)* identify and quantify asbestos in bulk samples by Transmission Electron Microscopy, and *(3)* perform counting procedures and quantify airborne fibers with Phase Contrast Microscopy.

3.3.10 *limits of abatement, n*—an area where asbestos-related activities will be conducted before, during and at the conclusion of the project, that is contiguous with and includes the limits of construction for an associated renovation or demolition project.

3.3.11 *non-friable organically bound (NOB) materials, n*—materials that are not friable and that consist of fibers and other particulate matter embedded in a solid matrix of asphaltic, vinyl or other organic substances.

3.3.12 *operations and maintenance (O&M) program, n*—a proactive management program to provide periodic surveillance of asbestos-containing materials, maintain them in good condition, mitigate fiber release from existing asbestos-containing materials, and clean up asbestos-containing dust and debris that has been released, in order to minimize worker or occupant exposure to asbestos fibers.

3.3.13 *polarized light microscopy (PLM), n*—a method of analytical mineralogy that uses an optical microscope to determine the optical properties of sample constituents and, in the case of bulk sample analysis for asbestos, to provide positive identification of suspect fibers as asbestos and to quantify the percent of asbestos in the sample.

3.3.14 *skim coat, n*—a thin finish coat applied to an existing plaster surface or other substrate to improve appearance or other reasons.

3.3.15 *suspect material, n*—material that is sampled or is presumed to contain asbestos on the basis of its location, purpose, appearance, and other factors considered by the inspector.

3.4 *Terms Defined in Practice D7521:*

3.4.1 *asbestos, n*—a collective term that describes a group of naturally occurring, inorganic, highly-fibrous, silicate minerals that are easily separated into long, thin, flexible, strong fibers when crushed or processed.

3.4.1.1 *Discussion*—Included in the definition are the asbestiform varieties of serpentine (chrysotile); riebeckite (crocidolite); grunerite (grunerite asbestos [Amosite]); anthophyllite (anthophyllite asbestos); tremolite (tremolite asbestos); and actinolite (actinolite asbestos). The amphibole mineral compositions are defined according to the nomenclature of the International Mineralogical Association.

3.4.1.2 *Discussion*—The mineral fibers described in this definition are listed below. This method is also applicable to other mineral fibers of interest not listed in Table 1.

3.5 *Acronyms:*

3.5.1 *ACM*—Asbestos-containing material(s)

3.5.2 *AHERA*—Asbestos Hazard Emergency Response Act

3.5.3 *EPA*—U.S. Environmental Protection Agency

3.5.4 *HEPA*—High Efficiency Particulate Air

3.5.5 *NAD*—No Asbestos Detected

3.5.6 *NESHAP*—National Emission Standards for Hazardous Air Pollutants; specifically, the National Emission Standard for Asbestos (40 CFR Part 61, Subpart M)

3.5.7 *NOB*—Non-friable organically-bound

3.5.8 *OSHA*—U.S. Department of Labor, Occupational Safety and Health Administration

3.5.9 *PPE*—Personal Protective Equipment

3.5.10 *PLM*—Polarized Light Microscopy

3.5.11 *TEM*—Transmission Electron Microscopy

3.5.12 *VAI*—Vermiculite Attic Insulation

4. Significance and Use

4.1 Management of asbestos-containing materials in buildings and facilities requires knowledge of the location, type, quantity, and condition of the material. The more complete and accurate the information available, the more appropriate and cost-effective are the control measures used to reduce possible exposure to airborne asbestos fibers. This is true whether the asbestos-containing materials remain undisturbed and completely intact, are selectively removed for maintenance or prior

TABLE 1 Asbestos

Asbestos	Chemical Abstract Service No.
Chrysotile	12001-29-5
Crocidolite	12001-28-4
Amosite	12172-73-5
Anthophyllite asbestos	77536-67-5
Tremolite asbestos	77536-68-6
Actinolite asbestos	77536-66-4
Asbestos	1332-21-4

to renovation, or are removed to the greatest extent feasible before demolishing the building or facility.

4.2 This practice describes three types of surveys that support different objectives. These are the Baseline Survey, the Project Design Survey, and the Pre-Construction Survey.

4.2.1 The Baseline Survey is a building-wide or facility-wide inspection that provides a general sense of the overall location, type, quantity, and condition of asbestos-containing materials present. It is thorough in that most accessible functional spaces are inspected and bulk samples taken of suspect materials observed. The baseline survey provides information for long-term management of asbestos-containing materials and prioritization of response actions. The presence of asbestos in suspect materials may be assumed or presumed in some cases without bulk samples being taken or analyzed. However, the baseline survey is unobtrusive in that samples are not taken where doing so would result in objectionable damage to surfaces or where institutional barriers preclude access. In a baseline survey, destructive testing is avoided. Posting of signs and labels required for compliance with OSHA regulations would use the information generated during a Baseline Survey.

NOTE 1—A Baseline Survey is sometimes called an "AHERA" survey because it provides the type of information used for management of asbestos-containing materials in schools. However, the baseline survey described in this practice requires inspection, bulk sampling, quantification, and assessment of suspect materials that are excluded by virtue of their type and location from the AHERA regulations for schools.

NOTE 2—Suspect material subject to disturbance by planned or emergency maintenance may not always be identified as to asbestos content in a Baseline Survey. Collecting a single bulk sample, or a small number of samples, to determine if the material contains asbestos does not constitute a survey within the meaning of this practice. Nonetheless, the sample(s) should be collected in accordance with the methods described in Appendix X1 (this must be done by a properly-credentialed individual) and analyzed as set forth in 6.5.

4.2.2 The Project Design Survey is more focused than a Baseline Survey and is used to provide information to the Project Designer for preparing abatement plans and specifications. The locations inspected are limited to the areas that will be affected by the abatement project. If the project is being done prior to renovation or demolition, the construction plans or at least a clear statement of the scope of the renovation or demolition work are required for a proper Project Design Survey. Destructive testing is often required for a Project Design Survey. The presence of asbestos in suspect materials is always confirmed in a Project Design Survey rather than being assumed or presumed. Other information required for the Project Design is collected during the survey.

4.2.3 The Pre-Construction Survey is performed in anticipation of renovation or demolition where a Baseline Survey has not been conducted and there is no information, or insufficient information, as to the existence of asbestos-containing materials within the planned limits of construction. The Pre-Construction Survey requires destructive testing if concealed spaces are to be breached during construction. If asbestos-containing materials are found, a Project Design Survey is conducted to provide information for preparing the plans and specifications. The Pre-Construction Survey satisfies the EPA NESHAP requirements for renovation or demolition to "thoroughly inspect the affected facility."

NOTE 3—On August 7, 2015, the EPA published a clarification letter allowing for the use of the Pre-Construction Survey for compliance for the asbestos NESHAP requirements to "…thoroughly inspect the affected facility…" [40 CFR Part 61.145(a)] . This clarification letter can be found on the EPA's Applicability Determination Index (ADI) as item number A150001. The clarification letter explains what sections of this practice must be used for compliance.

4.3 The inter-relationships among the three types of surveys and with other ASTM asbestos control standards is shown in Fig. 1.

4.4 This practice emphasizes the concept that a Comprehensive Building Asbestos Survey consists of more than the collection and analysis of samples, and the report is more than a compilation of laboratory results. It is important to inspect as many functional spaces as possible and to document the reasons why certain functional spaces were not inspected and locations where no suspect materials were observed and, consequently, no samples were taken. Reasons might include access limitations, the absence of materials to sample, the existence of information from previous surveys, or the availability of reliable documentation such product data sheets or Safety Data Sheets (previously known as Material Safety Data Sheets, MSDS) where the content of that document specifically details the absence of added asbestos. It is worthy to note that it can be difficult to find MSDS or product data sheets for installed materials or in older buildings or structures. It is also known that asbestos content was not always disclosed in these documents. In other cases there may be a material descriptions (as with asphaltic roofing products) where the term "encapsulated asbestos" is used. Terms of this nature do not do not constitute the absence of asbestos. If the absence of asbestos is not clearly noted on these documents they should not be used to eliminate an installed material from a survey.

4.5 A Comprehensive Building Asbestos Survey is not limited to the class of materials commonly referred to as asbestos-containing building materials (ACBM), defined in the AHERA regulations as "... found in or on interior structural members or other parts of a building." Items that are difficult to distinguish as such may include cooling towers, laboratory hoods, gaskets, chalkboards, and other articles. These may be installed in, attached to, or adjacent to the building or facility but are not as clearly a part of the building or facility as fireproofing or floor tile. Nonetheless, such items still fall within the scope of an asbestos management program and therefore are addressed in this practice. Locations outside the building, in particular equipment in industrial facilities and power plants, and crawl spaces underneath the building are within the scope of a Comprehensive Building Asbestos Survey.

4.6 This practice is intended to be used by individuals who are conducting a Comprehensive Building Asbestos Survey for the owner or manager of a building or facility under a contractual arrangement for services as well as by employees of the owner or manager. If the individual is conducting the survey under a contractual arrangement (which may be with the firm employing the individual), the owner or manager of the building is still responsible for certain activities as described in this practice.

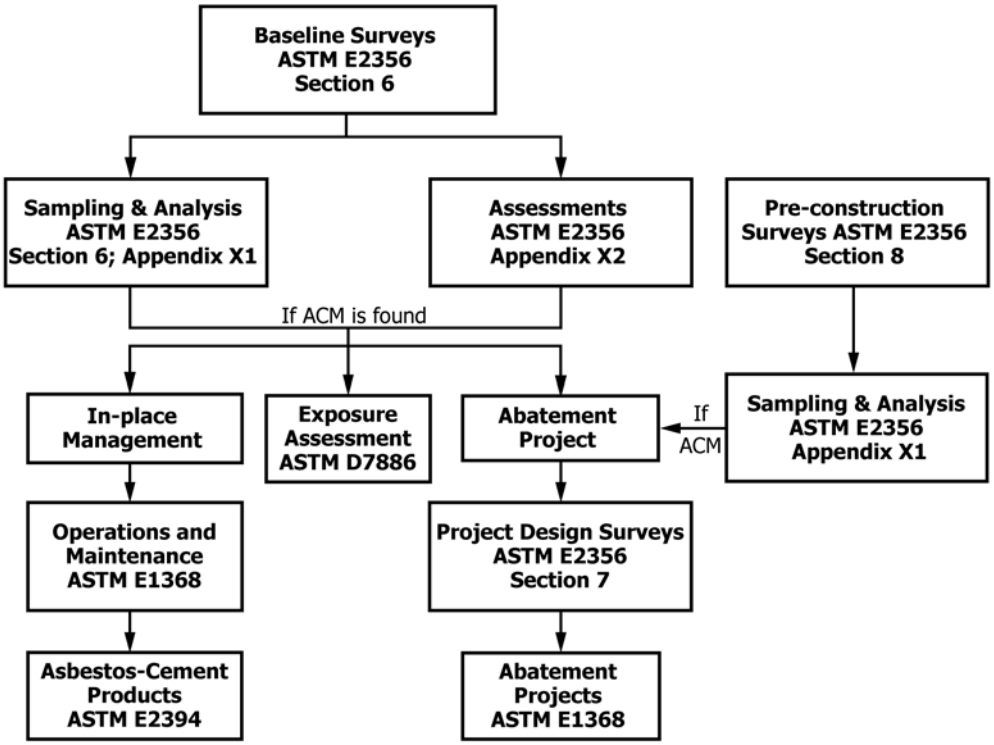

FIG. 1 Relationship Between E2356 Surveys and Other Standards

5. Qualifications and Responsibilities

5.1 This section describes the qualifications and responsibilities of the individuals who participate in the Comprehensive Building Asbestos Survey. The requirement for accreditation as an Inspector in accordance with the Model Accreditation Plan applies to the activities covered by this practice. Additional accreditations may be required, and qualifications may be imposed by state licensing (certification) requirements or the policies of the owner or manager of the building or facility that are beyond the scope of this practice. Field experience in performing asbestos building surveys as described in this practice is of paramount importance.

5.2 Not all of the qualifications discussed herein will be required for every Comprehensive Building Asbestos Survey conducted, and in many cases one individual (usually the accredited inspector) will have more than one, and possibly all, of the required credentials.

5.3 Qualifications and responsibilities of individuals conducting the survey:

5.3.1 *Accredited Inspector*—For both types of surveys, accreditation as an Inspector is required for the individual who takes the bulk samples and otherwise performs the physical activities comprising the survey. This includes review of relevant building documentation and preparation of the survey report.

5.3.2 *Management Planner*—For a baseline survey, accreditation as a management planner is only required for hazard assessment and determination of response actions if the survey is performed in a school, but is a desirable credential for all buildings and facilities.

5.3.3 *Project Designer*—For a project design survey, accreditation as a project designer is desirable because this survey will provide information for the plans and specifications to be used on an abatement project.

5.3.4 *Contractor/Supervisor*—For a project design survey, accreditation as a contractor/supervisor would be helpful because of the knowledge of abatement processes such an individual possesses.

5.4 In addition to the above accreditations, the following credentials are evidence of the ability to perform one or more of the aspects of a Comprehensive Building Asbestos Survey.

5.4.1 Credentials that indicate knowledge of building design include experience in building design, construction, or operations and academic degree(s), licensure, or registration as an architect or engineer.

5.4.2 Credentials such as academic degree(s) or certification in industrial hygiene, occupational safety, or a related field indicates knowledge of the hazardous properties of asbestos and other substances as well as the means of controlling the hazards.

5.4.3 Credentials that indicate knowledge of building construction and operations include field experience in building construction, renovation, demolition, or maintenance, or a combination thereof; or formal or on-the-job training in construction technology or management.

5.5 *Qualifications and Responsibilities of Owner or Manager of Building or Facility*—To be able to provide the necessary information, access, and other support to the

inspector(s), the staff of the building or facility owner or manager should have taken at least a two-hour Asbestos Awareness course.

5.6 Laboratories analyzing the samples shall possess one or more of the following qualifications in addition to, or as part of, any applicable state licensing requirements.

5.6.1 For bulk sample analysis using Polarized Light Microscopy:

5.6.1.1 Accreditation by the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute of Standards and Technology (NIST), or that offered by the other accrediting organizations that assures that participant laboratories are in compliance with the international laboratory standard through ISO/IEC 17025;

5.6.1.2 Participation in the Bulk Asbestos Proficiency Analytical Testing Program (BAPAT) provided by the American Industrial Hygiene Association (AIHA) Proficiency Analytical Testing Programs, LLC; and

5.6.1.3 Certification under the requirements found in state or local asbestos regulations where this issue is addressed.

5.6.2 Air samples are not collected or analyzed from the areas where bulk samples are obtained as part of a Comprehensive Survey.

6. Baseline Surveys

6.1 *Planning the Survey*—It is essential that the planning stage of an asbestos survey be complete in addressing the following issues and be defensible. A well-planned survey will consult other appropriate professionals, trades, or knowledgeable individuals who may provide valuable information regarding systems included in the survey.

6.1.1 *Establishing the Purpose of the Survey*—The purpose of the Baseline Survey is to identify suspect asbestos-containing materials as defined in the scope of the survey. Management of the ACM will include normal O&M activities over a long term and will include prioritizing asbestos hazards for the purpose of planning future abatement activities. If the inspection is for pending demolition or renovation activities, see Section 7 on Project Design Surveys.

6.1.2 *Deciding Who Conducts the Survey*—Whether the inspection is conducted by an outside consultant or in-house staff, the inspector shall be properly-credentialed as an asbestos building inspector by either federal EPA or an EPA approved state program under the Model Accreditation Plan. The inspector may also be required to be licensed by the state, city, or local jurisdiction of the inspection, or combination thereof.

6.1.2.1 In-house staff should have a more intimate knowledge of the locations of suspect materials and the use and occupancy of the areas containing those materials. Bulk sample collection by in-house inspectors may be useful when dealing with emergency repairs or planning operations and maintenance activities when only a few bulk samples are required. However, in-house staff usually has other responsibilities that may preclude the timely completion of a baseline survey, and they may not have the experience necessary to perform a thorough survey.

6.1.2.2 The outside consultant should have insurance covering asbestos operations to insulate the owner from potential liability. In most cases, conflict of interest issues would be best avoided by using an outside consultant. Typically, outside consultants can complete a survey in a more timely fashion and provide a more thorough and unbiased report than in-house personnel. Additionally, building owners and managers can benefit from the consultant's experience gained while inspecting other facilities.

6.1.3 *Establishing the Scope of the Survey*—It is essential that the inspector have documented, in writing, the exact scope of work for which he is responsible. A Baseline Survey would normally be comprehensive in nature. However, if the inspection is to be limited to certain buildings, or portions of buildings, the specific areas to be inspected must be documented in order for the inspector to achieve substantial completion of the contract, and not be held responsible for further work. One of the most important functions in-house personnel can provide is to participate in determining the purpose of the survey, planning the survey and reviewing the results of the inspection done by the outside consultant. In-house personnel should also play a role with providing access to all areas of the building/facility to the survey team(s) and be available to answer questions posed by the survey team and the building occupants.

6.1.3.1 Identify buildings, or portions of buildings, to be inspected. Each individual building shall be inspected separately and all functional spaces inspected, whether or not bulk samples are taken therein. A separate set of homogeneous areas of suspect material shall be identified, sampled or assumed, and determined to be ACM or non-ACM per building. A homogeneous area may not be extended to include more than one building, but may include components exterior to a building such as cooling towers, vessels, and piping. Data forms, supplies, and equipment must be sufficient to address multiple buildings if necessary.

6.1.3.2 ACM should be identified in the Baseline Survey regardless of whether it is used as a construction material or not, and whether located inside, outside or underneath the building, as long as the area inspected is within the scope of survey. This should specifically include stored materials such as gaskets, packing, or insulation not yet installed in or on the facility.

6.1.3.3 In some industrial facilities, there may be gaskets, packing, and other ACM installed in equipment (such as furnaces) that are not part of the building systems (such as HVAC). The equipment may be in operation at the time of the survey, or the suspected ACM may be inaccessible for other reasons. For example, the inspector may lack the tools and skills to properly disassemble the equipment for access to the suspected ACM. The scope of work for the survey should be clear as to whether this equipment is to be inspected and under what circumstances. The most convenient, and often the safest, time to inspect such equipment is when it is out of service for maintenance or while production is interrupted. The plant manager should make a list of equipment with suspect ACM and the plant's O&M plan should specify if and when gaskets, packing, etc., are to be sampled.

6.1.4 *Inspection Requirements*—A typical scope of work for an asbestos survey will address the following topics: survey

protocol, what materials will be sampled, what materials will be presumed/assumed (floor tiles, floor tile mastic, roofing materials, gaskets, and packings), what materials will not be included in the survey, quantification of materials, areas of the building/facility to be surveyed, access to specific areas of the building/facility (high ceilings, vaults, computer rooms, roofs, etc.), areas of the building/facility not to be surveyed (pipe chases, wall cavities, roofs), numbers of samples, quality control, follow-up analyses (point-counting, TEM), time schedules, and deliverables (reporting, reporting format, floor plans or drawing, and so forth). Bulk sampling shall be done to prove that the material in question is not ACM. Otherwise the suspect material shall be assumed to be ACM, and documented and managed accordingly (see Appendix X1, Sampling Techniques and Equipment).

6.1.4.1 Under this practice, a minimum of three bulk samples representative of each different homogeneous area of suspect material to be sampled shall be collected and analyzed to prove that the material sampled is not ACM. See 6.4.6.1 for specific minimum numbers of samples by type of suspect material. Situations that call for more than the accepted minimum should be called to the attention of the building owner.

6.1.4.2 Field notebooks should include forms for the collection of information as follows: a complete list and location of functional spaces to be inspected (see 6.4.2); bulk sample logs (see 6.4.3); a complete list and location of suspect materials and homogeneous areas (see 6.4.5); chain of custody (see 6.4.9.1); assessment information (see 6.6). Samples of forms are provided in Appendix X3, Field Data Collection Forms.

6.1.4.3 Destructive testing is not performed on a Baseline Survey and therefore suspect materials in concealed spaces are not directly sampled, assessed or quantified. However, the inspector may, if specifically requested by the building owner, indirectly infer the location, quantity and condition of concealed suspect materials on the basis of information from accessible confirmed ACM that appears to be part of the same homogeneous area. In this case the concealed material will be treated as ACM. The assumptions on which such extrapolations are based should be clearly spelled out in the survey report.

6.1.5 *Analytical Requirements*—At a minimum, Polarized Light Microscopy (PLM) shall be used to analyze bulk samples, as described in 6.5.1.1. A laboratory qualified in accordance with 5.6.1 shall be used. If confirmation of negative PLM results by gravimetric analysis and quantitative Transmission Electron Microscopy (TEM) may be required, a laboratory with those capabilities must be selected. A determination shall be made initially that all samples required to be collected will be analyzed unless the "positive stop" approach described in 6.5.5 is used.

6.1.6 *Survey Report*—A survey report will be generated that should include; at a minimum; the date of the inspection and report; the accreditation number and dates of accreditation for the inspector(s) conducting the survey; identification, quantification, and location of all suspect material; an indication of whether the material is ACM or non-ACM; assessment information on condition of ACM; and how the ACM relates to building function. The survey report will include a complete laboratory report detailing the analysis of each bulk sample analyzed. Applicable sections of this practice, including appendices, should be referenced in the report (see 6.7). Preparation of the survey report will be facilitated if the forms used for data collection in the field are designed so they are consistent in format with corresponding tables in the report. If information is recorded electronically in the field it may be possible to import the files directly into the survey report.

6.1.7 *Schedule*—A schedule must be coordinated with the building owner that will provide access as necessary for a preliminary site visit, as well as the performance of the comprehensive survey. Contractual issues on completion of work and submission of report must also be addressed as planning issues.

6.1.7.1 Preliminary site visits may be scheduled at any time and should give the inspector an indication of the type and variety of suspect materials present, the scope or extent of the work, and normal use and occupancy of various areas of the facility. Typically the preliminary site visit provides the inspector(s) the opportunity to become familiar with a building/facility and provides an opportunity to ask questions affecting the performance of the survey to develop a cost proposal for the completion of the survey.

6.1.7.2 Bulk sampling activities should be scheduled when the functional spaces to be inspected are unoccupied. This may mean night or weekend work, as the case may be. An inspector shall not disturb suspect material in the unprotected presence of building occupants. Facilities that operate on a 24-h basis may have to isolate or demarcate areas for sampling or may assume all identified suspect materials in areas that may not be isolated to be ACM. Because OSHA regulations requires respirator and protective clothing use in the absence of a negative exposure assessment, sampling in unoccupied areas is least troublesome to both the building owner as well as the inspector. Security systems or escort, or both, may also have to be coordinated with the owner.

6.2 *Estimating the Cost of the Survey—Estimated Cost of Survey*—Many factors affect the cost of performing a comprehensive asbestos survey. Some of these factors may vary over time and may be dependent upon regional, state, or other economic factors such as salaries, benefits, cost of living, and the economic condition of the companies, or individuals performing the survey or laboratory analyses. This practice does not attempt to identify or address those issues. This practice attempts to identify, but not quantify, the most common components that affect the cost of performing a comprehensive asbestos survey. Companies or individuals purchasing asbestos survey services should clearly define the scope of services to obtain the most accurate and comprehensive price.

6.2.1 The preliminary site visit may or may not affect the price of the survey. Depending upon the contractual arrangement and the company providing the proposal, the time and expense of the preliminary site visit may be absorbed into the cost of doing the survey or provided without charge.

6.2.2 *Document Review*—The review of construction documents including specifications, blueprints and possibly product receipts provide information regarding asbestos-containing