APPENDIX B
THE INSTALLATION ASBESTOS SURVEY AND ASSESSMENT
(REFERENCE PWTB 420-70-8, CHAPTER 5)

APPENDIX B
THE INSTALLATION ASBESTOS SURVEY AND ASSESSMENT
(REFERENCE PWTB 420-70-8, CHAPTER 5)

B-1 Organizing and Conducting the Installation Asbestos Survey

a. This survey must be conducted by either AHERA certified in-house personnel or the project may be undertaken on a contract basis by a competent firm. The usual sequence of steps to follow includes:

(1) Obtaining a complete listing and physical description of all buildings and structures within the facility.

(2) Obtaining copies of all reports or databases pertaining to past asbestos surveys or abatement projects.

(3) Performing site inspections of each building and structure.

(4) Collecting and analyzing bulk samples for asbestos.

(5) Assembling the database.

b. Each of these steps is shown in more detail in figure B-1.

B-2 Components of the Installation Asbestos Survey

a. *Building and structure inventory*. Before commencing the actual site inspections, it is important to obtain a list and physical description of each building or structure to be included in this survey. Additional information, such as the number of square feet, the present use, and future plans for the building, will be useful survey data. As-built drawings or even a reduced footprint of the building are useful in the field when mapping the areas of ACM. Original construction specifications, when available, are notoriously unreliable as sources concerning the presence of ACM. Construction specifications may specify an asbestos-containing product, but the phrase or equivalent is frequently included, so that there is no guarantee that the material is actually an ACM. The only truly reliable approach is to sample the suspect material and have it analyzed.

b. *Review existing facility ACM data*. The presence of ACM in DA buildings has been a topic of concern for well over a decade and a number of facilities had initiated their own surveys. Existing databases may be out of date because of changes in personnel assignments or the press of other commitments. Any previous surveys should be evaluated to determine whether the data is currently relevant, and it may be possible to build upon an existing survey to bring it up to date.

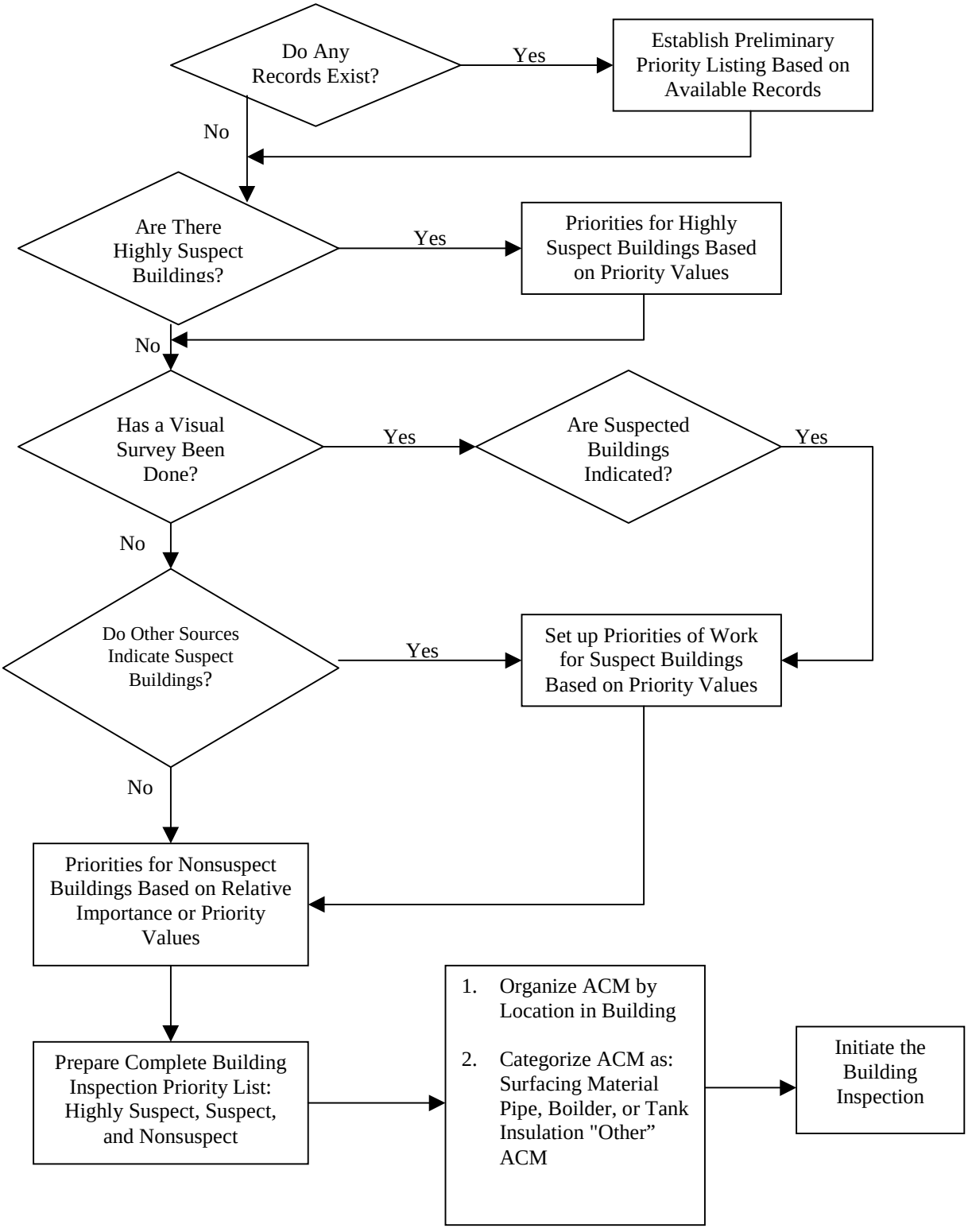

Figure B-1. Asbestos Survey Flowchart

c. *Conducting site inspections*.

(1) *Walk-through survey*. A thorough walk-through survey should be made of each building. Each building manager should be contacted beforehand to arrange for access into locked spaces. The inspection normally begins in the boiler room and expands to include other functional spaces in the same building. Lagged vertical riser pipes commonly run through closets, storerooms, or other out-of-the-way places. If it is known that the building is to be demolished, it would be prudent, whenever practicable, to break into chases, or walls and ceilings to determine whether ACM is present. Crawl spaces and attics should be checked carefully. For structures built upon a concrete slab, asbestos lagged pipe may be present in below-slab trenches. Building maintenance personnel are often a valuable source of information regarding the details of construction and the locations where ACM may be present. It is important to remember that if a situation is discovered that is immediately dangerous to life or health, the inspector should immediately notify the Safety Office.

(2) *Collection of bulk samples*. Collecting a sufficient number of representative samples of the various types of ACM is a vital part of the survey. These bulk samples should be carefully selected from each type of suspect construction material from locations throughout the functional space. In the case of pipe lagging, for example, the idea is to distribute the bulk sample variants so as to include all variants of pipe lagging having different physical appearances (e.g., changes in an outside diameter (OD), covering material, hardness, or color). Additional information on bulk sampling and analysis are contained in chapter 8.

B-3 Army Asbestos-Containing Material Assessment Checklist

a. The Army ACM Checklist in appendix C is divided into two parts.

(1) Part I addresses the extent of existing damage and the potential risk of damage to friable ACM.

(2) Part II addresses exposure potential and associated factors that contribute to health hazards in the occupied functional space being evaluated.

b. Evaluating the extent of damage to the ACM or the potential for damage is an important part of the assessment. This is because, in most cases, damaged ACM will release more airborne asbestos fibers than undamaged ACM under identical conditions. Also, the more extensive the damage, the greater the potential for fiber release.

c. Assessment factors, such as physical damage, water damage, asbestos content, and the attendant value-weighted conditions, in Part I is self-explanatory. Other assessment factors, in Part I and II however, have additional considerations that could influence the evaluator’s choice of a value-weighted condition. The remainder of this section deals with some additional considerations.

d. The first assessment factor listed in Part I, physical damage to ACM, has the five value-weighted conditions of high, moderate, low, minimal, and none. A consideration for the evaluator should be the age of the ACM. If the age is greater than 30 years, the normal deterioration of the binding agents may have produced a surface material that has a potential for fiber release, per unit of surface area damaged, much greater than for newer and similar surface ACM. An evaluator who would normally rate a certain extent of damage as low for 15-year-old sprayed-on ACM might want to rate the same extent of damage as moderate for a 35-year-old material. The age of the ACM should also be considered when determining the potential for damage from water and routine maintenance or repair. In some assessment algorithms, the design of a roof above the ACM is considered. There is a greater potential for rainwater damage to ACM under a flat roof than under a sloped or hipped roof.

e. In considering the asbestos percent content of ACM factor, the assumption is that as the percentage of asbestos in the ACM increases so does the potential for airborne fiber release. This would undoubtedly be true if the same binding agent were used in all ACM. However, not all ACM is created equal. It is quite possible that an ACM with an easily degraded starch, water-soluble binder and an asbestos content of 15 percent would have a greater fiber release potential than an ACM with 50 percent asbestos and a water-insoluble binder.

f. The evaluator's choice of a value-weighted condition for each assessment factor should be based upon all detailed and relevant information available.

B-4 Guide for Completing the Asbestos-Containing Material Assessment

a. A survey is defined in this manual as the inspection of functional spaces to locate, identify, and measure the amount of ACM present.

b. An assessment further evaluates the ACM in terms of:

(1) Its potential to become airborne, or the actual extent to which it is a source of airborne fibers (damage).

(2) What extent humans are exposed to airborne fibers in the functional spaces of a facility containing asbestos.

c. Army asbestos management programs will include an assessment with any survey conducted.

d. An assessment is used to determine if corrective action is needed, what corrective action to use, and prioritizing the corrective actions. The assessment process includes:

(1) Identifying the type of ACM by taking bulk samples (i.e., wall board, pipe insulation, surface compound, etc.)

(2) Evaluating the potential for fiber release (exposure potential).

(3) Identifying and assessing the current condition of ACM using the following information:

(a) *Physical damage*. If damage is present from vandalism, accidental physical contact, or any other cause. Evidence of debris on horizontal surfaces, hanging material, dislodged chunks, scrapings, indentations, or cracking are indicators of poor conditions. If coated surface gives when slight hand pressure is applied or the material moves up and down with light pushing, then the ACM is no longer tightly bonded to its substrate.

(b) *Water damage*. Inspect the area for visible signs of water damage, such as discoloration of or stains on the ACM; stains on adjacent walls or floors; buckling of the walls or floors; or areas where pieces of the ACM have separated into layers or fallen down, thereby exposing the substrate.

(c) *Deteriorating or delaminating from substrate*. Inspects the area for quality of installation (i.e., separating into layers, adhesive failure) or environmental factors which affect the cohesive strength of ACM.

(4) Identifying potential for future damage, disturbance, or erosion of material, including accessibility of material, frequency the area is used, activity likely to cause damage, and any planned changes to the area.

e. Other important factors that must be included in the assessment of ACM are the inherent friability of the material, percentage of asbestos in the material, where material is located, number of people in the area, the duration of occupancy, location of ACM to air plenum or direct airstream, and importance of the area.

f. In most cases the asbestos material is covered with a protective jacket of cloth, tape, paper, etc. These bonding materials will prevent the material from becoming friable and/or airborne. Most nonfriable materials can be broken without releasing significant quantities or airborne asbestos fibers. Surfacing materials are usually bonded and will not become airborne unless disturbed (i.e., vibration, drilling, etc.) The amount of ACM should be identified as linear feet or square feet. All supporting building documentation should be included in the individual building reports (i.e., building drawings, sampling data, assessment data of homogenous materials per functional area, work sheets, etc.)

g. The evaluator must be minimally an AHERA certified inspector, if he or she is to complete the assessment. Completion of the assessment requires, in accordance with AR 420-70 and AR 200-1, the evaluator to be minimally an AHERA accredited management planner. Prior to commencing survey and assessments of functional spaces in a facility, the evaluator should have participated in AMT meetings during which inspection strategies and plans were discussed and written. Also, the evaluator should be provided and be familiar with any available facility site plans, as-built drawings, previous inspection reports, abatement records, and any other records, reports, plans, or accounts relevant to the ACM survey-assessment.

h. As stated in paragraph B-3, suggested ACM checklists are provided in two parts in appendix C. Use these checklists for assigning risk and exposure numbers. Using the numbers derived from the checklists, enter the matrix in table B-1 and find the corresponding assessment index. Then refer to table B-2 for definition of assessment index. For example, using table B-1, if the damage/risk potential is 25 and the exposure potential is nine, then the assessment index would be A. This would correspond to an immediate action from the information obtained in table B-2. The higher risk and exposure numbers and assessment index letters should be used only if there is a high probability of personnel exposure. The assessment scheme in the checklists is identical to the algorithm shown and discussed, with a few exceptions. The weighted numerical values corresponding to assessment choices in the algorithm do not appear in the checklists and some of the line items contain additional assessment choices. Management planners who want to prioritize functional spaces and, in turn, facilities, based upon a numerical score ranking, should use the values for the assessment choices given and the procedures discussed. In the future, management planners may use a database management system.

i. Once a checklist has been completed for every functional space within a facility, an AHERA-accredited management planner will compile and process the information. This information will allow the management planner to document and/or confirm the existence of homogenous areas of ACM and prioritize the facility in terms of its asbestos hazards relative to other facilities at an installation.

j. The following asbestos report format should be used:

(1) Survey introduction, general summary of findings, and recommendations.

(2) Individual building information should include the following:

(a) Army ACM Checklist for each functional area and homogenous material.

(b) Description of building use, summary of findings, and recommendations.

(c) Building diagrams showing sample locations with photographs of the sample locations.

Table B-1. Determination of an Assessment Index

Each assessment factor in the checklist has one or more value-weighted conditions. For example, for the assessment factor water damage to ACM, the value-weighted conditions are yes, valued at three points and no, valued at zero points. For every value-weighted condition in the checklist, the corresponding point value, in parentheses, follows a line, which is provided for the checkmark, used to indicate the assessment factor condition selected by the evaluator. Following the selection of value-weighted conditions for all assessment factors in part I of the checklist, the sum of the points is determined. The sum is the damage value, entered at the end of part I and is used in the matrix below. The exposure value is similarly determined from data in part II and used as the second entering argument in the matrix.

Using the damage/risk potential and exposure potential values derived from the checklist (Army ACM assessment checklist), as entering arguments, use the matrix below to find the corresponding assessment index.

	Exposure Potential (1<E<26)			
Damage/Risk Potential (1<D<20	26-17	16-10	10-5	4-1
20-17	A	A	A	B
16-11	A	B	C	D
10-5	A	B	C	E
4-1	A	C	D	F

Table B-2. Management Corrective Action

Assessment Index	Recommended Management Corrective Actions
A	*Immediate action* – Requires assessment by certified personnel (in-house or contractor) who are experienced in and qualified to conduct asbestos assessments. Possible follow-up actions may include isolation of the area and the restriction of access and/or immediate removal of the ACM. If removal is indicated, action planning should include a detailed survey. This condition will likely involve a near term expenditure of funds. Managers must know exactly what needs to be done to eliminate the asbestos hazard and how to use available funds most effectively.
B	*Action as soon as possible* – Requires assessment by certified personnel (in-house or contractor) who are experienced in and qualified to conduct asbestos assessments. Initiate a special O&M program immediately. Possible follow-up actions may include the limiting of access to the area and the scheduling of removal during periods of low activity in the facility, not waiting for the normal repair and maintenance cycle.
C	*Planned action* – Requires assessment by certified personnel (in-house or contractor) who are experienced in and qualified to program. Initiate a special O&M program. Removal should be scheduled as part of the normal repair and maintenance cycle of a facility, minimizing cost and disturbance.
D	*Repair* – Initiate special O&M using certified personnel. Damaged areas should be repaired, where repair means returning damaged asbestos-containing building materials

	(ACBM) to an undamaged condition or to an intact state so as to contain fiber release. Schedule removal when practical and cost effective. Take preventive measures to reduce further damage.
E	*Monitoring* – Continue special O&M using certified personnel. Take steps to prevent damage to the ACBM or other ACM. Frequently monitor the condition of all ACM.
F	*Immediate action* – Continue special O&M using certified personnel until major renovation or demolition requires removal or until assessment factors change.

b. In the simplest of arrangements, the ACM checklists may be kept in a loose-leaf binder with tabs separating the information for each building. A more efficient means would be to contact the AEIS to obtain a copy of the current database in use. Utilization of a centralized database source for maintaining specific building information required for asbestos surveys will enable installations to access the system and keep it updated as removals/abatements, etc., take place. More importantly, a statistical analysis of the homogeneous materials in the database system would be performed to limit the amount of asbestos sampling required for future asbestos surveys. This would allow a centralized asbestos program manager to evaluate homogeneous materials used throughout Army installations to determine if this material is required to be sampled in future asbestos surveys. Once a homogeneous material has been identified as being an ACM then additional sampling of this material is not necessary. Additionally, non-ACM can also be eliminated from future asbestos surveys therefore reducing the cost of sampling homogeneous materials which are or are not ACM.

c. It is also important to note that a back up to the database and a current hard copy should be retained in the event of accidental data loss.

B-5 Factors Used in the Assessment Process

a. *Assessment information*. The need for asbestos control beyond a special O&M program depends on the likelihood of fiber release from ACM. It should be noted that the mere presence of ACM does not in itself create a condition that requires its removal. The possibility of fiber release can be assessed by evaluating the material's condition, physical characteristics, and location.

b. *Potential fiber release*. Factors for assessing potential fiber release are described in paragraphs B-4 and B-5. The major factors to be considered are briefly reviewed here.

(1) *Current condition of ACM*. If water or physical damage, deterioration, or delamination of the material is evident, then fiber release has occurred, is occurring, or is likely to occur. The appearance of the material and the presence of peeling, cracking, or crumbling material may indicate fiber release.

(2) *Possibility for disturbance or erosion*. Visible, highly accessible materials in areas frequently used or needed periodic maintenance are the most vulnerable to physical damage. Also, in this category are materials subject to vibration from mechanical equipment, sound, or other activities. ACM in an air plenum or near a forced airstream (e.g., air from a

heating vent) is likely to suffer surface erosion. In addition, fibers released into an airstream may be transported to other parts of the building, possibly exposing more people. Any planned changes in building use should also be considered when assessing future potential fiber release.

B-6 Exposure Analysis

a. An exposure analysis should be conducted prior to selecting an abatement method. This analysis considers all descriptive and quantitative factors (related to material condition, extent, etc.) compiled during the building asbestos survey and relates them to the potential for occupant exposure to ACM. Prior to the conduct of an exposure analysis, the Asbestos Management Team (AMT) should establish a written protocol that includes the following:

(1) A procedure for ranking, prioritizing, or rating the visual assessment factors described previously in paragraph B-4.

(2) Definitions of qualitative judgments, such as high exposure potential or moderate damage.

(3) The relative importance of quantitative data, such as bulk sampling results or air sampling results described in PWTB 420-70-8, Chapter 8.

(4) Assignments of exposure analysis responsibilities to members of the AMT.

b. Some AMTs may find it useful to use an algorithm to provide a quasi-quantitative basis to an otherwise subjective assessment. The recommended assessment method is easy to understand and use; is quantitative enough to provide a measure of hazard severity to allow the prioritization of facilities in terms of the need for corrective action; and provides a listing of factors not readily amenable to quantification, but which should be considered by the IC in final corrective action decision making.

(1) The assessment algorithm presented and discussed here is self-contained and simple to use. The algorithm consists of a checklist (see appendix C), an assessment index matrix, and a table of recommended management actions. In accordance with Army policy, the checklist must be completed by an AHERA certified management planner. The management planner may use the checklist either in concert with a survey inspection of a functional space or in a separate evaluation of the ACM in a functional space at a later date, following a survey inspection.

(2) The assessment algorithm discussed is a modified US Air Force system that must have the conditions specified in PWTB 420-70-8, Paragraph 5-8 b and is more applicable to small Army installations. The assessment algorithm for large Army installations is found in PWTB 420-70-8, Appendix D. The Army ACM checklist Part I and Part II

incorporates AHERA terminology and is the recommended method to use. To use this scheme, a management planner works through the
checklist making value judgments for each of the damage/damage potential and exposure situations which are then used in table B-1 to determine a letter assessment index. For each letter index, a recommended corrective management action is listed in table B-2.

(3) The assessment algorithm is intended for use by a trained evaluator; that is, someone who is familiar with ACM and knows of the layout and purposes of the facilities. The checklist applies to friable ACM or normally nonfriable ACM which has become friable as a result of damage. The ACM is also further classified as one of the major three types; surface materials, thermal system insulation, and miscellaneous materials. Other nonfriable forms of ACM shall be managed satisfactorily by an O&M program with abatement necessary only as part of facility alteration/repair, maintenance, or demolition.

(4) An asbestos survey, locating, sampling, and measuring homogeneous areas of ACM should be conducted concurrently with the assessment, when possible. The term homogeneous area refers to an area of surface material, thermal system insulation, or miscellaneous material that is uniform in color and texture.

B-7 Management Considerations

a. Even though an assessment index may accurately reflect the existing asbestos health hazard within a functional space, it probably will not be an accurate and complete measure of the AMP. The assessment index takes neither economic nor social factors into consideration. These factors often represent the greatest obstacles to managing and controlling asbestos hazards. A set of appropriate considerations is listed below.

(1) *Cost considerations (estimating cost effectiveness).*

(a) Cost of abatement (contractor’s estimate plus in-house personnel dedication).

(b) Cost of temporarily relocating personnel and equipment for the abatement.

(c) Cost of nonproductivity resulting from relocation of personnel and equipment.

(d) Cost savings in preplanned remodeling, renovation and/or repair projects resulting from abatement activities.

(e) Cost savings associated with enhanced use of functional spaces, in facilities which have been purged of ACM hazards.

(2) *Morale considerations*.

(a) Effect on morale of abatement-related personnel relocation.

(b) Effect of the notification of the need for abatement action on the morale of those individuals who occupy the space. Any abatement action will alert them to the fact that they had been working in a space determined as a high health risk environment.

(3) *Miscellaneous considerations*.

(a) Effects of flooding, wind, and fire damage on ACM integrity.

(b) Climatological restrictions of abatements (amended water can freeze, thus making spraying impossible).

(c) Geographical restrictions on abatements (OCONUS facilities may have special problems).

(d) Problems with functional spaces that are controlled areas.

- Unauthorized access and potential compromise of classified materials in high security areas.
- Pilferage in a warehouse.
- Existence of ignition sources (e.g., smoking, non-explosion proof electrical equipment) in or near combustible material storage areas, associated with asbestos abatement workers.

(e) Special facility use (childcare centers and hospitals).

(4) Determination of the appropriate option (i.e., abatement or special O&M) for each situation ultimately depends on the experienced professional judgment of the members of the AMT who are charged with this responsibility.

b. Internal discussion and review among members of the AMT are encouraged to ensure that all relevant factors are considered in assessing the potential for release of asbestos from ACM.