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	Engineering and Design ASBESTOS SURVEYS AND ASSESSMENTS STANDARD SCOPE OF WORK	
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DEPARTMENT OF THE ARMY
U. S. Army Corps of Engineers
Washington, D. C. 20314-1000

EP 1110-1-22

CEMP-RA

Pamphlet
No. 1110-1-22

15 September 2000

Engineering and Design
ASBESTOS SURVEYS AND ASSESSMENTS
STANDARD SCOPE OF WORK

1. Purpose. The standard Scope of Work (SOW) described in this Engineer Pamphlet (EP) provides a framework for developing site- and project-specific scopes of work for completion of asbestos surveys and assessments at Army facilities.

2. Applicability. This pamphlet applies to all USACE Commands responsible for the design of asbestos survey and assessment projects.

3. Distribution. Approved for public release; distribution is unlimited.

4. References. References are included in Appendix A, Paragraph 1.1.

5. Discussion.

a. This EP provides a standard SOW for conducting asbestos surveys and assessments at Army facilities.

b. This EP provides a framework based on Federal regulations and guidance in effect as of the EP date of publication. The SOW editor shall ensure that updated Federal requirements, as well as applicable state and local (or Outside Continental United States (OCONUS)) requirements are addressed in using this SOW.

c. Those responsible for designing asbestos survey and assessment projects shall be familiar with the concepts and procedures described in the references in Appendix A.

FOR THE COMMANDER:

MILTON HUNTER
Major General, USA
Chief of Staff

3 APPENDICES
APP A - Asbestos Surveys & Assessments SOW
APP B - Installation Asbestos Survey and Assessment
APP C – Army Asbestos-Containing Material Checklist

APPENDIX A
ASBESTOS SURVEYS AND ASSESSMENTS
STANDARD SCOPE OF WORK

TABLE OF CONTENTS

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NOTE TO THE SCOPE OF WORK EDITOR

This standard scope of work (SOW) is to be used for performance of asbestos surveys and assessments at government facilities. In order to ensure that site-specific conditions and requirements are adequately addressed, the editor must possess current certification

as an Asbestos Inspector/Management Planner, and should have prior knowledge and experience related to asbestos surveys.

This standard SOW was designed to comply with Army and other Federal requirements regarding asbestos surveys, assessments, and hazard management, including disposal of any waste generated. Consult state and local authorities to determine whether established requirements and procedures more protective than those outlined in this SOW exist. This SOW was developed using the most current standards in force at the time of issue. The editor should determine whether current Federal and Army regulations differ from those cited.

Select the appropriate options denoted in brackets [ ] for the specific needs of the asbestos survey and assessment project. The installation may not have adequate information to specify the type of assessment, or may not possess the training and experience required to make this decision. In this case, the USACE will assist the installation in determining the appropriate type of assessment. This may require a site visit and a preliminary records review.

The Federal regulations listed in Section 1.1.1 of this SOW are updated frequently. The editor should monitor the Federal Register and also be familiar with any changes to the Army requirements to ensure that all aspects of the survey and assessment project comply with the most current Federal regulations and Army requirements. State and local regulatory agencies should also be consulted to determine if any additional requirements exist that might impact the project. For example, state and local regulatory agencies may require special certifications or licenses for persons conducting asbestos inspections, or developing management plans.

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1.0 PROJECT OVERVIEW, OBJECTIVES, AND DESCRIPTION OF WORK

1.1 REFERENCES

1.1.1 Federal

1.1.1.1 U.S. Environmental Protection Agency

a. 40 CFR Part 763, Asbestos-Containing Materials in Schools; Subpart E, Final Rule; 52 FR 41846, October 30, 1987

b. U.S. EPA, Asbestos Hazard Emergency Response Act (AHERA) AHERA 3,5,7 Rule

c. U.S. EPA, "Asbestos in Building Simplified Sampling Scheme for Friable Surfacing Materials

d. U.S. EPA, Guidance for Controlling Asbestos-Containing Building Materials, 560/5-85-024, June 1985

e. U.S. EPA, Managing Asbestos in Place, 20T-2003, July 1990

f. U.S. EPA, Model EPA Curriculum for Training Building Inspectors

g. U.S. EPA, Test Method for the Determination of Asbestos in Bulk Building Materials, 600/R-93/116, July 1993

1.1.1.2 Occupational Safety and Health Administration (OSHA)

29 CFR Part 1910 and 1926 Implementing the Occupational Safety and Health Act

1.1.2 U.S. Army

a. AR 200-1, Environmental Protection and Enhancement, Paragraph 8.2.h
b. AR 420-70, Facilities Engineering, Buildings and Structures, Paragraph 3-3
c. Department of the Army, Public Works Technical Bulletin (PWTB) 420-70-8, Installation Asbestos Management Program, (http://www.hnd.usace.army.mil/)
d. DA Hazardous Asbestos and Lead Optimal Management System (HALO)
e. USACE, EM 200-1-2, Technical Project Planning Process
f. USACE, EM 385-1-1, Safety & Health Requirements Manual

1.1.3 State, Local, Outside Continental United States (OCONUS) Agreements, etc.

[Insert applicable references.]

1.1.4 Other Organizations

1.1.4.1 American Industrial Hygiene Association

American Industrial Hygiene Association (AIHA) administers the Bulk Asbestos Proficiency Analytical Testing Program (BAPAT) **(**http://www.aiha.org**)**

1.1.4.2 American Society of Testing and Materials (ASTM)

a. ASTM C 732 (1995) Aging Effects of Artificial Weathering on Latex Sealants
b. ASTM E 736 (1992) Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
c. ASTM D 1331 (1989: R 1995) Surface and Interfacial Tension of Solutions of Surface-Active Agents
d. ASTM E 1368 (1997) Visual Inspection of Asbestos Abatement Projects

1.1.4.3 National Institute of Occupational Safety and Health (NIOSH)

NIOSH Manual of Analytical Methods NIOSH Pub No. 84-100, 1984; and Supplements

1.1.4.4 National Institute of Standards and Technology

National Voluntary Laboratory Accreditation Program (NVLAP)) (http://ts.nist.gov/ts/htdocs/210/214/214.htm)

1.2 REGULATORY REQUIREMENTS

1.2.1 Regulatory Authority/Requirements

The Contractor shall conduct all work in accordance with Federal, state and local regulations and requirements. Where inconsistencies exist between Federal, state, and local requirements and this SOW, the Contractor shall follow the most protective requirements.

1.2.1.1 Federal Requirements

a. Survey and Assessment Procedures and Requirements

Following the AR 200-1 and AR 420-70, all persons conducting asbestos surveys and/or assessments shall possess current USEPA asbestos training certifications as specified in 40 CFR Part 763, Sub-part E, Appendix C. The types of certifications required for specific tasks are detailed in this SOW. The Contractor shall complete the asbestos surveys and assessments utilizing the guidance provided in PWTB 420-70-8, Installation Asbestos Management Program, Chapter 5 (Appendix B), Chapter 8 and in Asbestos Hazard Emergency Response Act (AHERA) protocols.

b. Health and Safety Requirements

****

NOTE: The procedures discussed in 29 CFR 1910.146 must be considered when a potential for confined space entry (i.e., crawl spaces, duct work, vaults, etc., which meet the definition of a confined space) exists.

****

The Contractor shall comply with OSHA requirements, particularly 29 CFR 1910.134 and 29 CFR 1910.1001, during the performance of activities described in this SOW. Special emphasis shall be placed on safe practices for confined space entry, fall protection, and electrical hazards. The Contractor shall also follow all requirements stated in the USACE Safety and Health Requirements Manual (EM 385-1-1), including submission of an Accident Prevention Plan (APP). Field activities shall not be initiated before the Contracting Officer's designated Contracting Officer Technical Representative (COTR) has accepted the APP.

1.2.1.2 State and Local Requirements

****

NOTE: Reference state, local, (OCONUS where applicable) or installation specific requirements that differ from the Federal requirements cited above that are applicable to the work addressed in this SOW.

****

[The Contractor shall comply with the following state [and local] [and installation] requirements

in completing the activities required by this SOW. [Insert applicable references.]]

1.3 SITE CHARACTERISTICS, OBJECTIVES AND DESCRIPTION OF WORK

1.3.1 Site Location/Characteristics

****

NOTE: Consult the installation POC to obtain site location information including installation and building designations or addresses, and other appropriate location information for all facilities and areas to be included in the survey. Include details regarding the number of facilities and their sizes to be included in the asbestos surveys and assessments.

****

The survey shall address the following facilities at the following locations:

[Insert installation and building designations or addresses, and other appropriate location information for all structures, facilities/units and areas to be included in the survey.]

1.3.2 Previous Studies and Results

[Prior to initiating field activities required by this SOW, the Contractor shall review the previous study data results collected at the location(s) identified in Paragraph 1.3.1 and provided as an attachment to this SOW.]

1.3.3 Project Objectives and Description of Work

The project objectives are: [insert text as applicable]. The Contractor shall conduct asbestos surveys and assessments at the structures, facilities/units and areas listed in this SOW. The asbestos survey shall identify the location and estimate the quantities of Asbestos Containing Materials (ACM) that must be removed or managed in place for the structure(s), facilities(s)/units and areas listed above. An asbestos assessment shall further evaluate the potential for ACM identified to become airborne and cause potential human exposure. Procedures and requirements for completing the asbestos survey and assessment are defined in the paragraphs that follow.

1.3.4 Data Quality Objectives (DQOs)

****

NOTE: Project-specific DQOs must be developed in keeping with installation-specific factors and requirements and followed to provide project required data quality.

****

The Contractor shall meet the project-specific Data Quality Objectives (see Glossary) for the sampling, analysis and Quality Assurance/Quality Control (QA/QC) defined in Paragraphs 2.2 and 2.3. The DQOs include collection of the proper numbers and types of samples, the appropriate sample collection and analytical methodologies, the field and laboratory QA/QC procedures, and the data validation and evaluation processes in order to provide required data quality. The

sampling data collected shall be compared to action levels defining asbestos hazards provided in this SOW.

1.3.5 Bid Assumptions

****

NOTE: Include project-specific assumptions for the Contractor to use in developing a cost estimate. Contact the installation POC for site-specific information to assist in the development of realistic assumptions. For example, floor plans may accompany the SOW to give the Contractor an understanding of the level of effort required to survey each facility. Typical analysis cost per sample can range from $5 to $8.50 for PLM and $60 to $90 for TEM. Check with several labs in the area of the project on sample costs and procedures. Also assume the QC samples will equal 5% to 10% of total samples analyzed.

****

Bid assumptions include: [insert bid parameters]

2.0 PROJECT REQUIREMENTS

2.1 TASK 1 DESCRIPTION OF CURRENT CONDITIONS/PROJECT WORK PLAN

****

NOTE: Determine the need for the Contractor to review the installations Asbestos Management Program and provide a copy if required.

****

The Contractor shall coordinate with the COTR and the installation POC to obtain any useful information describing current conditions of the facilities that will be included in the surveys and assessments. This shall include information concerning facility construction, maintenance, and management history, and any useful information from previously conducted asbestos surveys and assessments.

2.1.1 Background Data

The Contractor shall review general facility information [and summarize the results of any previous surveys or analyses] that established the possible presence of ACM to be investigated under this SOW.

2.1.1.1 Asbestos Management Program

[The Contractor shall review the installation's Asbestos Management Program.]

2.1.1.2 Interviews

[The Contractor shall conduct interviews of personnel familiar with the facility history and maintenance patterns. Personnel to be interviewed shall include:

a. Installation Asbestos Management Team Leader
b. Installation Environmental Officer to review preexisting data and verify maintenance histories

c. Director of Public Works (to discuss assessment logistics, i.e., accesses and surveys scheduling.)

d. [Safety Officer]

e. [Insert others whose interviews may be pertinent to the project]]

2.1.1.3 Summary of Pre-existing Data, Asbestos Management Plan, and Interviews

[The Contractor shall include a project deliverable as an attachment to the Project Work Plan that summarizes the review of the pre-existing data, the Asbestos Management Plan, and the interviews. The summary shall address the following:

a. Reliability of Previously Collected Data

A brief summary of the data reliability from previous studies.

b. Asbestos Management Plan

A brief description of the Installation's Asbestos Management Plan and a summary of information pertinent to any previous asbestos identification data, maintenance history, or maintenance practices.

c. Interviews

A brief summary of the interviews and the conclusions reached.]

2.1.2. Project Boundaries Identification/Floor Plans

Site maps identifying structures, facilities/units and areas that will be assessed, and copies of floor plans for each are attached as a part of this SOW. The Contractor's inspector shall use these plans when performing Task 2 to identify and record sample locations in developing the Sample Location Documentation.

2.1.3 Preliminary Site Visit/Walkover

The Contractor, the COTR and the Installation POC shall conduct a joint preliminary site visit/walkover. This walkover will be used to ensure that all site-specific conditions and special accessibility requirements are addressed in the Project Work Plan.

2.1.4 Occupant Notification Unit Access

****

NOTE: Occupant notification of planned assessment activities is an installation responsibility. Coordinate with the Director of Public Works and the Environmental Manager.

****

The Government shall notify occupants impacted by the survey and arrange access regarding the activities planned [Insert text as applicable.] days prior to beginning the assessment activities. The Contractor shall coordinate with the COTR and installation authority responsible for notification and access to establish an entry schedule based on the Contractor's Project Work Plan.

2.1.5 Project Work Plan

The Contractor shall prepare a Project Work Plan that describes the required information in sufficient detail to assure the COTR that the Contractor fully understands the project. The survey

and assessment strategy will be based on Appendices B and C. The plan shall include but not be limited to the following:

- Accident Prevention Plan (APP) including project safety and health requirements.
- Project objectives/requirements, including [usability of pre-existing data,] access requirements, scheduling, escort requirements, and laboratory turn-around time requirements.
- DQOs.
- Asbestos Sampling Plan including sample identification process and location decision logic.
- Identification, qualifications, and photocopies of certifications of the project personnel/team.
- Identification and qualifications of each laboratory that will be used to analyze samples.
- Site maps, building identifications, building numbers, floor plans/sketches, (provided as part of this SOW).
- [Summary of Pre-existing Data, Asbestos Management Plan, and Interviews.]

2.2 TASK 2 CONDUCT SURVEY AND ASSESSMENT

2.2.1 Facility Walk-Through/Survey

****

NOTE: Confirm with the Installation POC which field data collection forms will be required to be used during the walk-through survey, and select the appropriate bracketed sentence. Confirm with the Installation POC that cameras may be used at the installation for documentation purposes.

****

The Contractor shall conduct a thorough walk-through survey as described in Appendix B. During the walk-through survey, the Contractor shall identify all surfacing material, Thermal System Insulation (TSI) and miscellaneous materials that potentially contain asbestos. The survey will include exterior building surfaces, roofing, outside steam lines, and all interior areas such as pipe chases, closets and other out-of-the-way places. Prior to developing a specific sampling approach, the Contractor shall carefully delineate homogenous areas based on similar appearance, color, texture, and date of application.

During the walk-through survey, the Contractor shall utilize [field collection forms in the HALO Users Manual,][Data input forms supplied by the customer,][Army Asbestos-Containing Materials Checklist provided in Appendix C. This checklist addresses both the extent of damage to ACM, and the potential human exposure from damaged ACM.] [The Contractor shall also photograph each homogenous area.]

The Contractor shall distinguish between friable and nonfriable suspect ACM on all surfaces including walls, ceilings, and structural members by determining if the material can be crumbled or reduced to powder by normal hand pressure. Note that under the USEPA definition, the term friable material also includes both damaged material and material that possesses the potential for damage when touched or otherwise disturbed. The Contractor shall also assess the condition of all suspect ACM and classify the condition of suspect ACM as “Significantly Damaged”, “Damaged”, or “Good Condition”.

2.2.1.1 Sample Location Documentation

Upon completion of the walk-through survey, and prior to actual sampling, the Contractor shall clearly mark, number and otherwise uniquely identify all homogenous areas of suspected ACM and samples to be taken, by marking the locations on the floor plan or sketch including room layout. The resultant information shall be compiled and labeled the "Sample Location Documentation" before actual sampling commences. Sampling shall be completed immediately following the walk-through survey and the documentation of sample locations, prior to exiting the facility.

The COTR reserves the right to audit the Sample Location Documentation, at any time during the course of the project. The Sample Location Documentation shall be included as an attachment to the Asbestos Sampling Plan, and shall be submitted as a part of the Asbestos Survey and Assessment Report.

2.2.2 Collection of Bulk Samples

The Contractor shall ensure that all personnel collecting bulk samples are currently certified as AHERA Asbestos Inspectors. The Contractor shall collect bulk samples following the guidance provided in PWTB 420-70-8, Chapter 8-3, "Bulk Sample Collection" and in the ACM in Schools Rule found in 40 CFR 763.86. The Contractor shall use the specific procedures and techniques for bulk sample collection described in Section I of the USEPA "Model EPA Curriculum for Training Building Inspectors". The Contractor shall collect a minimum of three bulk samples per homogeneous area that is 1000 ft^2 or less, except as provided in 40 CFR 763.87, for all surfacing materials. Suspect surfacing materials (i.e., sprayed or troweled on) shall be sampled randomly following the USEPA document entitled "Asbestos in Building Simplified Sampling Scheme for Friable Surfacing Materials".

The Contractor shall collect a minimum of three samples for TSI that is not assumed to be ACM. If a TSI section is less than six linear feet or six square feet, a minimum of 1 bulk sample shall be collected, unless the TSI is assumed to be ACM.

[Destructive bulk sampling of [any] [exterior] [roofing] miscellaneous materials is not authorized.] [Destructive bulk sampling of miscellaneous materials is authorized, and sample location shall be coordinated with the facility management.] The Contractor shall collect the minimum number of bulk samples of miscellaneous materials following the guidance in the "AHERA 3,5,7 Rule".

2.2.3 Sample Identification

A unique sample identification code number shall be used for all bulk samples. The number is intended to facilitate sample tracking without revealing the identity of the sample to the laboratory. All sample containers shall be labeled immediately upon collection of the sample. Information on sample labels shall include the sample identification printed with a waterproof marker. Labels are used for identification and to preserve sample integrity.

2.2.4 Sample Chain-of-Custody

The Contractor shall follow a standard chain-of-custody protocol to document and ensure a continuous record of sample possession from the time of sample collection to the samples' receipt

by the laboratory. The Contractor shall complete and maintain chain-of-custody forms for each set of samples shipped to the laboratory, and a copy of the forms shall accompany each shipment of samples. The labeled sample containers (i.e., zipper sealed baggie) shall be packaged and shipped in sturdy containers. Corresponding chain-of-custody documentation shall accompany each shipping container to the laboratory. The shipping container shall be securely taped shut and a custody seal shall be placed across the seams between the lid and the body of the shipping container. All shipping containers shall be [express] mailed to the laboratory. The samples shall be mailed, at a minimum, on a [weekly] [insert time period] basis during the project's duration.

2.2.5 Decontamination

Field sampling equipment shall be decontaminated following standard methods. At a minimum, the field decontamination procedures for non-disposable sampling equipment (e.g., knives and coring devices) shall consist of either wiping off the equipment twice using a clean wet wipe or washing in a solution of non-phosphate detergent, and rinsing with distilled water. The equipment shall be decontaminated prior to each use, between each sample collection, and prior to leaving the site. The Contractor shall coordinate with the installation environmental officer to determine requirements for disposal of sampling decontamination waste, and used personal protective equipment.

2.3 TASK 3 SAMPLE DATA ANALYSIS, EVALUATION OF FINDINGS

2.3.1 Sample Preparation and Analysis

****

NOTE: Army guidance specifies that the laboratory performing the analyses of bulk samples all be accredited by NVLAP. The AIHA also accredits laboratories for bulk samples. Normally requirements for the use of NVLAP accredited Laboratories will be specified. Consult with the customer and the state to determine what accrediting status is required.

****

Samples collected during the survey and assessment(s) shall be sent to a laboratory accredited by [NVLAP] [or] [AIHA] for analysis. The laboratory must be accredited for each type of analysis required. Bulk samples collected by the Contractor during the survey shall be analyzed for asbestos using polarized light microscopy (PLM) [and transmission electron microscopy (TEM)].

2.3.2 Analysis of Bulk Samples

****

NOTE: There is a conflict between the OSHA construction worker protection asbestos standard and the EPA NESHAP standards regarding the composting or segregating of multi-layered systems during analysis. For example, OSHA considers wallboard, joint compound and joint tape as separate products. Therefore, under OSHA the wallboard, the joint compound and the joint tape must be analyzed separately. EPA, however, looks at wallboard, joint compound and joint tape as a single system and requires only a single, composite analysis of the three components. Another example is floor tile and mastic; these materials may be

sampled together, but must be analyzed and reported separately. When analyzing samples consisting of more than one component, each sub-component shall be analyzed and the analytical results reported separately, but listed together as a single sample consisting of several components. Specify the requirement for collection and analysis of multi-layered systems.

****

The Contractor shall assure that the laboratory follows the guidance provided in PWTB 420-70-8, Chapter 8-4 “Analysis of Bulk Samples for Asbestos” for all bulk sample analyses. Bulk samples collected by the Contractor during the survey(s) shall be analyzed by polarized light microscopy (PLM). TEM analysis shall be performed on the samples when PLM analysis is inclusive for percent (%) asbestos.

The most current version of the methodology shall be used. Use of other methodologies must be accepted in advance by the COTR. Results shall be reported in units of percent (%). Multi-layered systems shall be surveyed and assessed in the following manner [insert appropriate text]

2.3.2.1 Laboratory Turnaround Time

The Contractor shall submit the laboratory report analytical results to the COTR within [insert number of days] days of the sampling.

2.3.3 Quality Assurance and Quality Control (QA/QC)

The Contractor shall establish a QA/QC protocol according to EPA 560/5-85-024, June 1985, Guidance for Controlling Asbestos-Containing Building Materials. QA/QC sample information must be carefully documented in the Asbestos Survey and Assessment Report, including the Asbestos Sampling Plan and Sample Location Documentation, analytical results, and Chain-of-Custody records. The Contractor shall collect a minimum of one QC sample for every twenty investigative samples collected. [QA/QC samples shall be sent to a different [NVLAP] [or] [AIHA] accredited laboratory [and not the primary laboratory subcontracted]]. The Contractor shall specify the most advantageous technique to provide extra samples to the laboratory, should additional samples be required by the laboratory to replace sampling or QA/QC data lost due to laboratory mistakes. The Government is not liable for cost of additional sample collection due to laboratory mistakes, Contractor sample collection problems, or chain-of-custody errors.

2.3.3.1 Laboratory QA/QC

The Contractor shall verify that sample duplicates and laboratory blanks are used by the laboratory to measure precision and accuracy of laboratory analytical procedures in accordance with [NVLAP] [or] [AIHA] requirements.

2.3.4 Laboratory Report

The Contractor shall require that the laboratory provide the information necessary for the Contractor to comply with the data evaluation/validation procedures outlined in this SOW. This shall be included in a package containing the following information:

- Name, address and telephone number of [each] accredited laboratory conducting analysis of samples.
- Survey findings including a list of all materials sampled and analyzed, the analytical results, and lists of Friable ACM, Non-friable ACM, and Non-ACM.
- Laboratory analytical data sheets including identification and results of QC samples to include duplicates and laboratory blanks used by the Laboratory to measure precision and accuracy, samples, batch identification if applicable, and Chain-of-Custody forms
- Copy of Laboratory [NVLAP] [or] [AIHA] accreditation for bulk ACM analysis

2.3.5 Contractor Certification of Project Data Validity

The Contractor shall certify that all field data collected for purpose of determining the presence of asbestos are valid and meet the DQOs.

2.4 TASK 4 Asbestos Survey and Assessment Report

****

NOTE: The SOW editor should confer with the installation POC to determine the specific reporting formats required.

****

The Contractor shall prepare an Asbestos Survey and Assessment Report containing the elements described in Paragraphs 2.4.1 through Paragraph 2.4.7 below. An Asbestos Survey and Assessment Report shall be prepared for each facility to document the findings of the asbestos survey.

2.4.1 General Report Contents

- Installation name and location
- Address (street, city, state and zip) and building identification number of assessed facility
- Facility manager or POC [and phone number]
- Contractor firm name, [address (street, city, state and zip)] [phone number]
- Date of assessment
- Name, signature and certification number of each inspector, management planner, and projected designer participating in the survey and assessment
- Name, address, and telephone number of the Contract firm and POC doing the assessment,
- Executive summary of survey and assessment including a list of all ACM
- Asbestos Sampling Plan with Sample Location Documentation
- Laboratory Report
- Recommendations
- Decision tree flow chart and explanation of Hazard Ranks/Assessments
- Bulk sample log
- Extent of materials drawing for each floor (estimated amounts)
- Photograph log
- Photographs of each homogenous area

- Glossary/Definitions of terms

****

NOTE: Specify which (if any) facilities should be combined into a single report, or if individual reports are required for every facility.

****

The Contractor shall provide [specific number] copy(ies) of the Asbestos Survey and Assessment Report(s). [The Contractor shall also provide an individual Asbestos Survey and Assessment Report for each building.] Requirements for content and format of each report(s) is detailed in Section 2.4 of this SOW. The report(s) shall be submitted to COTR in [pre-draft], [draft], [and] [final] forms in both electronic and hard copy formats.

2.4.2 Summary of Pre-existing Data, Asbestos Management Program, and Interviews

[The Contractor shall attach a copy of the Summary of Pre-existing Data, Asbestos Management Program, and Interviews.]

2.4.3 Contractor Data Certification

The Contractor shall certify that the data used to develop all conclusions and recommendations were reviewed, validated, and met the DQOs (i.e., that the data was sufficient to identify and characterize asbestos present).

2.4.4 Electronic HALO/Installation Data Downloading into Installation System

****

NOTE: All data collected during activities specified in this SOW are to be provided to the Army in a format compatible with the Army's Hazardous Asbestos and Lead Optimal Management System (HALO) or, if the installation does not utilize HALO, with the installation data management system requirements. HALO is a hazard management system designed to track asbestos hazards and actions taken in response to identified asbestos hazards. HALO requires an IBM-compatible personal computer (with a Pentium® processor), Windows 95, 16 MB of RAM, 10MB of available hard disk space, Word 97, and display resolution of 800x600 pixels. The current POC for HALO is:

USACE Engineering Research and Development Center (CEERDC)

Facilities Division, Materials and Structures Branch (CF-M)

(217) 352-6511 ext. 7239 (commercial)

Where the installation has no unique data management system for asbestos data, HALO shall be the default program for all deliverables under this SOW. The SOW should detail the procedures for the Contractor must follow when providing the results of asbestos surveys and assessments to the USACE representative for uploading into HALO or comparable system used by the installation.

At a minimum, the Contractor must be provided a copy of the HALO Data

Dictionary. The Dictionary identifies the table names, field names, data types, and all other required default values. The Dictionary is part of the HALO program and may be obtained by the installation, or by contacting CEERD CF-M. If the transferee is known, consult with them for reporting requirements. In every case, electronic archives should be produced for the record.

****

The Contractor shall provide laboratory data to the COR in both hard copy and electronic format. The electronic data report shall be provided in [HALO format] [insert other data management system as applicable].

2.4.5 Update Installation Management Plan

****

NOTE: If the installation does not use HALO for Asbestos Management Plan data management, the editor may choose to include a requirement in the SOW that the Contractor must update the installation Asbestos Management Plan data management system to incorporate the new data. Consult the customer to determine the scope of this task (e.g., whether to limit the task to the entry of new data into the appropriate electronic format, whether to include an update of a hard copy document, or whether to complete an addendum to the existing installation plan).

****

[After entering the assessment data into HALO, the Contractor shall run the HALO program to generate an updated installation Asbestos Management Plan.]

[The Contractor shall update the installation Asbestos Management Plan with the new survey data.]

2.4.6 Comparison of Contractor Findings to Installation HALO Findings

[The Contractor shall include a comparison of the assessment findings and recommendations to those generated by HALO.]

2.4.7 Contractor Conclusions and Recommendations

The report shall contain conclusions and asbestos control recommendations. The Contractor shall follow Chapter 6 in PWTB 420-70-8 in developing conclusions and control recommendations. [Where the assessor's findings and recommendations differ from those generated by HALO, the report shall provide the rationale for the assessor's findings and recommendations.]

3.0 SUPPLEMENTAL REQUIREMENTS FOR CONTRACTED SERVICES

3.1 CONTRACTOR FIRM/PERSONNEL QUALIFICATIONS

3.1.1 Contractor Firm Experience

The contracted firm shall posses a minimum of [specific number of] years experience in conducting asbestos surveys and assessments and shall posses adequate numbers of qualified staff. Three references, at a minimum, shall be required for previously completed projects of equal complexity to the project addressed in this SOW.

3.1.2 Contractor Inspector and Management Planner Qualifications

In accordance with the Model Accreditation Program described in 40 CFR 763 Subpart E, Appendix C, the Contractor shall use [one] [or more] persons currently accredited as AHERA Inspector and Management Planner. The Inspector shall determine the presence and physical characteristics of ACM. The Management Planner shall estimate the degree of current or potential hazard posed by the ACM, and shall develop a plan for management of the ACM.

3.1.2.1 EPA, State and Local Certification

****

NOTE: Specific EPA, state and local certification/licensure should be detailed in this section.

****

The Contractor shall use only personnel who possess current EPA, state and local (if necessary) accreditation and licenses as Asbestos Inspectors, Asbestos Management Planners, as appropriate, for the specific tasks described in this SOW. [It is the Contractor's responsibility to contact state and local regulatory agencies to determine specific certification/licensure requirements.] [Specific state [and local] certification/licensure pertinent to this installation include: [specify here.]]

3.1.2.2 Evidence of Certification

The Contractor shall include a copy of original certificate of accreditation and the most current refresher certificate for each asbestos inspector and management planner in the final report[s].

3.1.2.3 Record of Experience

A resume or other professional history for each of the certified inspector(s) and management planner(s) who are involved in the activities required under this SOW shall be included in the Project Work Plan.

3.1.2.4 Use of Asbestos Survey and Assessment Teams

****

NOTE: Indicate the number and size of survey teams for large, complex projects.

****

The Contractor shall specify the number of two-person teams that will conduct the survey evaluation in the Project Work Plan. The overall team leader shall have a minimum of three years experience conducting asbestos surveys.

3.1.2.5 Project Manager Experience

The project manager shall have a minimum of three years experience in managing asbestos survey and assessments, or related activities. The Contractor shall provide a resume or other description of the project manager's experience, which is directly applicable to the activities required under this SOW.

3.1.3 Contracted Laboratory Qualifications

The Contractor shall provide, as a part of the Project Work Plan, evidence that the laboratory(ies) used for sample analysis have current [NVLAP] [or] [AIHA] accreditation. The laboratory(ies) must be accredited for each analytical method used. All samples collected during the survey(s) shall be analyzed by a laboratory accredited under the [NVLAP] [or] [AIHA] for analysis by polarized light microscopy (PLM) as specified in 40 CFR 763.87, following EPA Method 600/R-93/116, July 1993. The laboratories must be independent of the Contractor and employ qualified analysts. The Contractor shall provide a copy of each laboratories' [NVLAP] [or] [AIHA] certification to the COTR or Installation POC, and also must include a copy in the final report.

3.1.4 Contractor Errors and Omissions Liability Insurance

****

NOTE: Consult with the customer and Contracting Officer to develop requirements for Contractor errors and omissions liability insurance as appropriate for the scope of the project.

****

The Contractor shall provide documentation to the Contracting Officer that the Contractor is currently covered by an errors and omissions liability insurance policy. [Insert the errors and omissions text as appropriate.]

3.2 PROJECT RECORDS

3.2.1 Record Keeping Requirements

The Contractor shall maintain all records related to the survey activities for at least [insert appropriate number of years] following completion of the activities outlined under this SOW. Records shall include:

3.2.1.1 Project Work Plan

3.2.1.2 Asbestos Survey and Assessment Report

3.2.1.3 Correspondence, Conference and Field Notes, Forms, Other Documentation

3.3 PROJECT COORDINATION

The Contractor shall coordinate activities through the COTR. Contact with installation personnel, including the installation POC, members of the installation asbestos hazard management team, building occupants or POCs, and other installation personnel shall be coordinated through the COR.

3.4 GOVERNMENT SUPPORT

****

NOTE: Little standard language is offered in this section, since the requirements will be very project-specific. The specific language will need to be defined by the customer. Include the name of the person who is responsible.

****

3.4.1 Government Quality Control Oversight and Support

[Insert appropriate provisions.]

The COTR reserves the right to audit the Sample Location Documentation at any time during the course of the project.

3.4.2 Rights of Entry, Security, and Escorts

****

NOTE: It is advisable that Contractor personnel be accompanied by an escort. The escort should introduce the team on behalf of the Asbestos Management Team, state how long the work is expected to take, answer questions, and observe the team while it works. This is a good public relations practice and helps to protect the installation, the Contractor, and the occupants from disputes regarding claims of loss and damage. The escort may use the time, on behalf of the Asbestos Management Team, to discuss occupants' concerns and to observe actual and potential hazards, and maintenance problems.

If an escort cannot be provided, special precautions must be taken to protect all parties. These precautions may include:

- A notice to occupants about the impending work including information for the occupant on how Contractor personnel should identify themselves.
- An agreement regarding what Contractor personnel may tell occupants about the work in response to questions.

****

[Insert appropriate provisions.]

3.4.3 Temporary Office/Equipment Storage/Staging Areas

The installation shall provide space to the Contractor for the duration of the field activities for use as a temporary office, equipment storage, and staging area. [The Government] [The Contractor] shall provide [insert appropriate text regarding utilities, phone lines, permits, etc.].

3.5 TRAVEL AND MEETINGS

All meetings shall be attended by the Contractor's PM, accredited inspector, [the Contracting Officer] [the COTR] [and installation POC].

3.5.1 Preliminary Project Site Visit/Walkover

The Contractor [PM and] designated accredited inspector shall visit a representative number of the facilities to be surveyed and assessed with the COTR and the installation POC. The purpose of the site visit/walkover is to verify that the scoped level of effort is appropriate for the site conditions.

3.5.2 Project Work Plan Review and Startup Meeting

The Contractor shall attend a start-up meeting at the installation to review, finalize and approve the Project Work Plan immediately prior to beginning field activities. The Contractor shall generate

meeting minutes that will be submitted to the COTR within [two weeks] of the meeting.

3.5.3 Final Asbestos Survey and Assessment Report Meeting

The Contractor shall attend a Final Asbestos Survey and Assessment Report Meeting at the installation to discuss the findings and recommendations of the report.

3.5.4 Additional Meetings

****

NOTE: Depending on the scope and duration of the project, the editor may require additional meetings during the performance of the project. For example, periodic progress report meetings would be appropriate for a longer duration or open-ended project.

****

3.6 SCHEDULES

****

NOTE: Because of the varying degree of complexity and extent of projects that may be addressed under this SOW, no standard language regarding scheduling is included in this SOW. The customer must be consulted to determine project milestones that meet the needs of the installation, and to determine scheduling requirements. Combine meeting topics where appropriate. At a minimum, the schedule milestones include:

1) Site visit/project walkover

2) Project Work Plan submission meeting

3) Project start-up meeting, if not combined with item 2), above

4) Final Survey Report submission meeting

****

[Insert appropriate schedule milestones.]

3.7 SUBMITTALS

3.7.1 Project Work Plan

The Contractor shall submit a Project Work Plan to the COTR, for government acceptance, as outlined in Paragraph 2.1.4.

3.7.2 Progress Reports

The Contractor shall provide [specify time period] project progress reports to the COTR. The report shall be due to USACE within one week of the end of a reporting period. The report shall identify the reporting period, the [facility (ies)] [unit(s)] surveyed, the number and type of samples collected, and the preliminary findings and recommendations.

3.7.3 Asbestos Survey and Assessment Report

The Contractor shall provide a survey report, as described in Section 2.4 above.

3.8 MISCELLANEOUS

3.8.1 Glossary

This section contains acronyms and terms used in this SOW. For a more complete listing of terms commonly used in reference to asbestos survey and assessment projects, refer to the regulations and standards referenced in Paragraph 1.1 of this SOW.

ACM	Any material containing more than 1% by weight of the regulated asbestos minerals (USEPA)
COC	Chain-of-custody. This refers to the custody procedures implemented to ensure a trail of accountability for samples from the time of collection to delivery at the laboratory. Also refers to the forms used to implement the procedures.
DQO	The qualitative and quantitative statements, guidelines, and requirements of paragraphs 2.2 and 2.3 of this SOW that clarify study objectives, define the appropriate type of data, and specify the tolerance levels of potential errors that will be used as the basis for establishing the quality of the data needed to support decisions. See EM 200-1-2, Appendix G, DQO Attainment Verification Worksheet for further refinement of the DQO definition.
EPA	Environmental Protection Agency (usually refers to the United States EPA, although the term USEPA is preferable when referring to the Federal agency. This helps to avoid confusion in states where the state environmental agency is also called the EPA, e.g., Illinois.)
HALO	The Army's Hazardous Asbestos and Lead Optimization Management System, which is a management system designed to track asbestos hazards and actions taken in response to identified asbestos hazards.
MAP	Model Accreditation Program identified in 40 CFR 763

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.

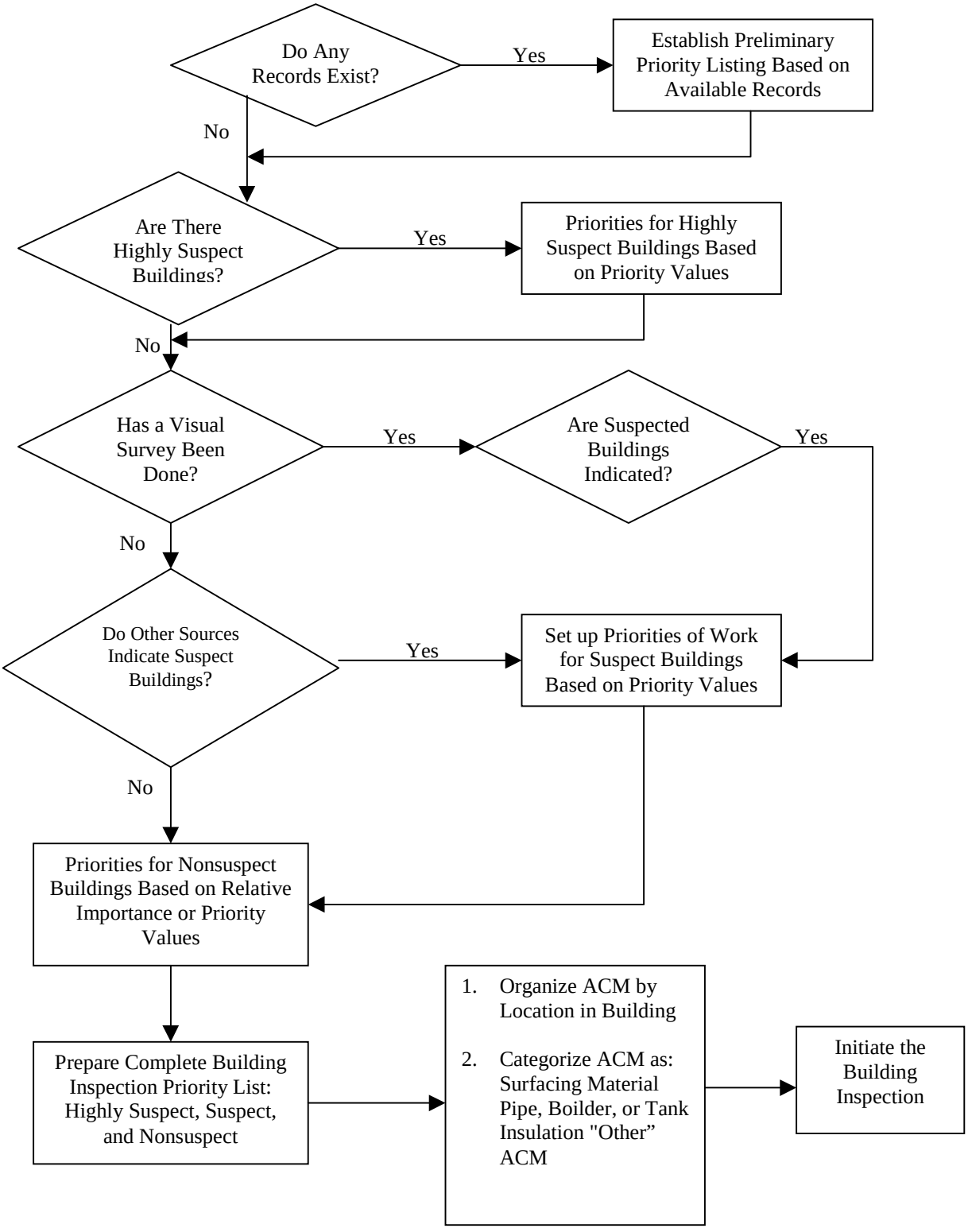

Figure B-1. Asbestos Survey Flowchart

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.

APPENDIX C
ARMY ASBESTOS - CONTAINING MATERIAL CHECKLIST

Part 1: Damage Assessment

Installation: _____ Bldg/Rm No.: _____

Facility/Office: _____ Inspector Name/Date:____

Functional Area: _____

Physical. Assess damage based on evidence of surface accumulation; or the condition of the sprayed-on or troweled-on surface materials; or physical deterioration or delamination of materials using hand pressure.

_____(0)	None	*Non-asbestos materials; or no damage or evidence of material fallout; or material is in fair to good condition; or nonfriable ACM, (i.e., floor tile, wallboard, etc.); or (ACM) with less than one percent.
_____(1)	Minimal	*Isolated and very small areas (less than 10 percent) of material damage or fallout; or controlled space and accessed by maintenance personnel only; or uncontrolled/occupied space.
_____(2)	Low	*Visible evidence of some surface accumulation; or controlled space and accessed by maintenance personnel only; or uncontrolled/unoccupied space.
_____(3)	Moderate	*Visible evidence of small areas (less than 10 percent) of surface accumulation; or controlled space and accessed by maintenance personnel only; or uncontrolled/unoccupied space.
_____(5)	High	*Visible evidence of widespread surface accumulation; or uncontrolled space and easily accessed by occupants.

Water.

_____(0)	None	No water damage.
_____(1)	Minor	Visible water damage (less than 10 percent) of ACM.
_____(2)	Major	Visible water damage (greater than 10 percent) of ACM.

*Note: If any one or a combination of these criteria are met, assign the corresponding value and line out the criteria that do not apply.

Part I: Damage Assessment. *(Continued)*

Proximity to items for repair. If both A and B apply, score the one with the highest rating. (Check all that apply. Maximum of 3 points.)

A. *Sprayed-on or troweled-on*. Could the friable ACM be damaged by routine maintenance activities?

_____(0) No routine maintenance is performed within the areas.

_____(1) Equal to or greater than five ft.

_____(2) Equal to or greater than one ft but less than five ft.

_____(3) Less than one ft from routine maintenance areas or a ceiling panel contaminated with ACM must be removed.

B. *Pipe, boiler, or duct insulation*. Could damage occur as a result of routine maintenance or by occupants of building?

_____(0) No.

_____(3) Yes.

Type of ACM.

_____(0) *Non-asbestos materials; or nonfriable (ACM, (i.e., floor tile, wallboard, etc.) in good to fair condition; or ACM with less than one percent.

_____(1) Miscellaneous ACM (i.e., ceiling tiles, etc.)

_____(1) *Boiler; or pipe insulation; or other ACM insulation materials (not accessible to occupants).

_____(2) Nonfriable ACM (i.e., floor tile, wallboard, etc.) in poor condition.

_____(2) *Boiler; or pipe insulation; or other ACM insulation materials (accessible to occupants).

_____(3) *ACM on exterior of supply ducts; or capable of being introduced into air ducts (i.e., deteriorated ACM located in area of air ducts; or above suspended ceilings).

_____(4) *Sprayed-on; or troweled-on surface ACM (accessible to occupants).

*Note: If any one or a combination of these criteria are met, assign the corresponding value and line out the criteria that does not apply.

Part I: Damage Assessment *(Continued)*

Percent asbestos.

_____(0) Less than one percent ACM.

_____(1) One to 30 percent ACM.

_____(2) 31 to 50 percent ACM.

_____(3) Greater than 50 percent ACM.

Note: If the percent asbestos content is less than one percent or nonfriable asbestos (in good to fair condition) then the total for percent asbestos category will be zero (0).

DAMAGE (d) TOTAL_____(Max 20, Min 0)

Bulk sample results should be reported using the following format:

Sample No.	Type Asbestos	%	Source

Analysis Performed by (Lab/Name/Date)_____

Part II: Exposure Assessment

Material friability. USEPA definition: hand pressure can crumble, pulverize, or reduce to powder when dry.

_____(0)	Nonfriable	Material (i.e., floor tile, wallboard, binder's etc.) in good to fair condition.
_____(1)	Low Friability	Material difficult to crumble by hand.
_____(2)	Moderate Friability	Material fairly easy to dislodge and crush.
_____(3)	High Friability	Material easily reduced to powder; or broken by hand.

Occupant accessibility to ACM fibers.

_____(0)	Low Accessibility	*Materials are not exposed; or totally isolated by permanent barrier; or accessible only during infrequent, occasional maintenance activity; or no air flow from the friable insulating material location to occupants of the building or storage areas.

Part II: Exposure Assessment *(Continued)*

_____(1)	Moderate Accessibility	*Only a small percent of material exposed; or material above a suspended ceiling; or material contacted during maintenance or repair; or material exposed, but not accessible to activity of normal occupants.
_____(4)	High Accessibility	*A large percent of material exposed; or material accessible to occupants; or airborne transport during normal activities.

*Note: If any one or a combination of these criteria are met, assign the corresponding value and line out the criteria that does not apply.

Activity/use.

_____(0)	None	No activity/storage activities.
_____(1)	Low	Infrequent maintenance activities only.
_____(2)	Moderate	Frequent maintenance activities only.
_____(3)	High	Normal occupant activities.

Air stream/plenum.

_____(0)	None	No perceptible air flow in the room or area.
_____(1)	Present	Airflow and no evidence of ACM present.
_____(2)	Present	ACM is exposed to perceptible or occasional air streams.
_____(3)	Present	*Airflow and evidence of ACM present in supply ducts/plenum; or recirculated; or subject to routine turbulence; or abrupt air movement.

Area of visible surface or damaged ACM.

_____(0)	Less than 10 cubic or linear feet (small areas should be repaired as soon as possible).
_____(1)	10 to 100 cubic or linear feet.
_____(2)	100 to 1000 cubic or linear feet.
_____(3)	Greater than 1000 cubic or linear feet.

Part II: Exposure Assessment *(Continued)*

For occupied facilities only.

Population. This involves defining average occupancy as the total number of building occupants and outside visitor traffic into a room or area during an eight-hour period. For example, a reception area in a DEH shop has one person assigned to the area. There are 15 individuals (including the receptionist) assigned to the building. They have approximately 240 customers (visitors) in the building during an eight-hour period. On overage, each customer (visitor) is serviced and departs the building within 30 minutes.

*Note: If any one or a combination of these criteria are met, assign the corresponding value and line out the criteria that does not apply.

(outside visitors x time spent/8 hours) in area/room + building occupants = average occupancy

Example: ([240 visitors x 0.5 hours]/8 hours) + 15 occupants = 30. ..... Score as 2

_____(1) Less than nine or for corridors.

_____(2) 10 to 200.

_____(3) 201 to 500.

_____(4) 501 to 1000.

_____(5) Greater than 1000.

_____(5) Medical facilities, youth centers, childcare facilities, or residential buildings, regardless of the population, will be assigned to this category.

For unoccupied facilities only.

_____(0) No ACM or less than one percent.

_____(1) Nonfriable ACM in good or fair condition.

_____(2) Nonfriable ACM in poor condition.

_____(3) Friable ACM in good condition.

_____(5) Friable ACM with visible evidence of damage.

EXPOSURE (E) TOTAL _____ (Max 26, Min 0) Inspection (Date) _____

Note: Provide any other relevant information on observations in the space provided below. If additional space is needed, attach additional pages as necessary.