U.S. ENVIRONMENTAL PROTECTION AGENCY

STANDARD METHODS FOR CONDUCTING ASBESTOS O&M WORK PRACTICES

Office of Administration and Resources Management
Safety, Health, and Environmental Management Division

Washington, D.C.

July, 1994

Background

EPA's national safety, health and environmental management program has as its focus the development, implementation and ongoing management of consistent asbestos-containing building materials (ACBM) Operations and Maintenance (O&M) Plans for each facility where ACBM are known or assumed to be present.

EPA's policy and program (hereinafter the "Program") have been developed with the goal of minimizing ambient asbestos fibers levels, economic, socially, technical, and environmental factors being taken into account.

As an integral part of EPA's Program for the management of ACBM at EPA facilities, Standard Operating Practices (SOPs) establish guidance for the general approaches and work practices, which are implemented at the operations level to effectuate the various requirements of the program in laboratory, field, and other settings.

The standard methods (SMs) document that follows is maintained under the SOP's, and provides detailed guidance for specific procedures and techniques, to be employed in the conduct of certain work activities. As the core of the SMs document, EPA's Safety Health, and Environmental Management Division (SHEMD) has developed a model O&M Program Document for managing ACBM at EPA occupied or controlled facilities. The model O&M Plan will aid Asbestos Program Managers (APM) in the development, implementation and administration of asbestos programs for the management of asbestos risks on a facility-specific basis.

These SMs are drawn from, and modeled after, the National Institute of Building Sciences(NIBS) Guidance Manual: Asbestos Operations & Maintenance Work Practices, a consensus project conducted according to procedures approved by NIBS Board of Directors. NIBS Work Practices, Asbestos Program Manager (APM) General Procedures and Worker General Procedures For In-Place Management of Asbestos are used as the starting point for developing this O&M plan for EPA occupied or controlled facilities. This document may also be applicable for use by other federal agencies, and state and local governments, as well as by private industry.

Editing this Model O&M Program

This document has been developed to be used in conjunction with EPA's July 1990 Guidance Document entitled Managing Asbestos In-Place -A Building Owner's Guide to Operations and Maintenance Programs for Asbestos-Containing Materials (EPA publication number 20t-2003), also known as the "Green Book". This document assumes that the users have a copy of the Green Book and are familiar with it's content. It also assumes that the users have copies of applicable federal, state and local regulations and are familiar with their requirements.

The designated APM is responsible for the editing of this document to meet the needs of the facility in which it is intended. These SMs are not intended to be used in an unedited format. This document is designed to assist the APM in creating an O&M manual for a specific facility. Introductory blue sheets (like this one) are included at the beginning of each section to help explain particular aspects of each section. These "blue sheet" introductions are not intended to be a part of the facility's final document, but are tools in the process of helping the APM in editing this document. Along with the introductory sections, notes are also found through-out the document referencing pertinent information that the editor/APM will need to determine and are recognized in the following formats:

[Information to be filled in or completed by the writer]

or

Editing Information
(to be read, action taken then deleted from final printing)

The following major portions require editing:

1. The cover.
2. The table of contents.
3. Section I, survey/assessment information must be incorporated. If a survey of a facility has not been performed, efforts should be made to have a thorough survey completed as soon as possible. An O&M Program for the entire facility cannot be prepared without a comprehensive survey for ACM.
4. Section I, locations of asbestos-containing building materials (ACBM) (text and chart).
5. Section II, APM information.
6. Section II, APM General Procedures.
7. Section III, Worker General Procedures.
8. The Work Practices.
9. Add and append appendix sections to reflect the needs of the facility.

10. Throughout the document reference is made to state and local regulations. Modify these standard methods as required to comply with applicable and/or more stringent state and local regulations. Include appendices containing state and/or local regulations.

Also enclosed is a 3 1/2" high density diskette that contains the unedited model EPA O&M documentation files in Wordperfect 5.1 format. These files are broken out into sections for easy accessibility and use. The following will reference the section to the file:

File	Sections/Title of Section
COVER.	Cover of Document
TOC.	Table of Contents for the entire document
INTRO.	Section I, Introduction
TYPES.	Section I, Types & Locations of Asbestos-Containing Building Materials
LOCATION.	Locations of Asbestos-Containing Building Materials
VALID.	Section I, Validation
O&M-WP.	Section I, O&M Work Practices
USE.	Section I, Use of O&M Work Practices
APM.	Section II, Asbestos Program Manager
WORKER.	Section III, Worker General Procedures
SUR1-7.	Section IV, Surfacing Materials Work Practices (1-7)
SUR8-13.	Section IV, Surfacing Materials Work Practices (8-13)
TSI.	Section V, Thermal Systems Insulation (TSI) Work Practices
MISC1-8.	Section VI, Miscellaneous Materials Work Practices(1-8)
MISC9-15.	Section VI, Miscellaneous Materials Work Practices(9-15)
MIS16-23.	Section VI, Miscellaneous Materials Work Practices(16-23)
MIS24-28.	Section VI, Miscellaneous Materials Work Practices(24-28)
MIS29-34.	Section VI, Miscellaneous Materials Work Practices(29-34)
APPENDIX.	Appendices A - K

To obtain an original, unedited copy of the version produced and published by the National Institute of Building Sciences(NIBS) Guidance Manual: Asbestos Operations & Maintenance Work Practices document you can call or write to:

The National Institute of Building Sciences
Publications Department
1201 L Street, N.W., Suite 400
Washington, D.C. 20005-4014
202/289-7800 FAX 202-289-1092

To obtain an original, unedited copy of the version produced and published by the National Institute of Building Sciences(NIBS) Guidance Manual: Asbestos Operations & Maintenance Work Practices document you can call or write to:

The National Institute of Building Sciences
Publications Department
1201 L Street, N.W., Suite 400
Washington, D.C. 20005-4014
202/289-7800 FAX 202-289-1092

To obtain a copy of the Green Book, Managing Asbestos In Place -"A Building Owner's Guide to Operations and Maintenance Programs for Asbestos-Containing Materials" you can call or write to:

The United States Government Printing Office
Superintendent of Documents
Mail Stop SSOP
Washington, D.C. 20402-9328
202/783-3238

Copies of EPA's Purple Book and Pink Book, can also be obtained by contracting the Government Printing Office.

Standard Methods for Conducting Asbestos Operations & Maintenance Work Practices

for

EPA Occupied Space in

[NAME OF FACILITY]
[ADDRESS]
[CITY, STATE, ZIP]

DRAFT

[Date]

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Examples:

V. Thermal Systems Insulation (TSI) Work Practices ..... NOT APPLICABLE

APM8 Confined Spaces ..... NOT APPLICABLE

M14 Cut or drill asbestos cement panels ..... NOT APPLICABLE

While page numbers should be modified to account for deleted pages and sections, DO NOT renumber any procedures or practices. Should it be necessary to add a new procedure or practice (based upon a condition unique to your facility), please add it at the end and assign a new number.

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I

Introduction

Information contained on pages 1, 2 and 3 are general in nature and should require the writer to only add the [Name of Facility], where indicated.

Specific building data regarding the type and location of Asbestos-containing building materials (ACBM) must be added at pages 4 and 5. It is important to note, however, that pages 4 and 5 can only be completed if an asbestos survey has been performed in the building. Preferably by the building owner, but EPA (as a tenant) may have elected to conduct the survey for ACBM.

Pages 6 - 19 are of general information or explanation, and should require the writer to only complete the [Name of Facility].

If an asbestos survey has not been performed, this document cannot be completed, and the writer should contact the EPA representative responsible for the space's lease.

Guidance in conducting an asbestos survey is provided by the following documents which are included in the SMs documents which are included in the SMs document as appendices:

Appendix J: Inspecting Buildings for Asbestos Containing Building Materials

Appendix K: Health and Safety Guidelines for EPA Asbestos Inspectors, revised March, 1991.

Section 1 Introduction

General This Asbestos Operations and Maintenance (O&M) Program has been prepared to provide guidance on worker protection, basic O&M procedures, O&M cleaning practices, and procedures for responding to minor asbestos fiber release episodes at [Name of Facility] with asbestos-containing building materials (ACBM). This O&M Program has been adapted from the National Institute of Building Sciences' (NIBS) "Guidance Manual: Asbestos Operations and Maintenance Work Practices".

Scope and Flexibility The O&M practices described in this O&M Program are applicable to projects qualifying as "small scale/short duration" (SS/SD) as defined by the Occupational Safety and Health Administration (OSHA) of the U.S. Departments of Labor and EPA. The work practices are intended to assist in meeting the current OSHA regulations applicable to O&M work. The current and proposed EPA and OSHA small-scale, short-duration project definitions are reproduced in Appendix "H" of this manual. Appendix "G" of OSHA regulation 29 CFR 1926.58 discusses work practices and engineering controls for small-scale, short-duration renovation and maintenance activities involving ACBM. Appendix "I" of this O&M Program describes the specific requirements for work practices and engineering controls for SS/SD renovation and maintenance as discussed in OSHA Regulation 29CFR 1926.88.

Projects larger than SS/SD will not be performed by [Name of Facility] Staff, but will be undertaken by qualified and trained outside asbestos abatement contractors. O&M work practices in this O&M Program are not to be used for activities requiring full scale removal of ACBM.

This O&M Program is intended for use by an Asbestos Program Manager (APM) and trained workers. The APM is identified in Section II, Asbestos Program Manager General Procedures. This O&M Program provides checklists and step-by-step work practices which should be used by an APM and workers for performing O&M work. Because asbestos in [Name of Facility] is present under widely varying circumstances including, but not limited to, its condition, location, material type, friability, and accessibility, a range of guidance for common operations and maintenance procedures is offered in this O&M Program. Flexibility is crucial to the efficient and cost effective completion of an O&M activity, therefore, the ultimate choice of methods is left to on-site personnel who have first-hand knowledge of the asbestos material, facility conditions, and other pertinent needs. These work practices were written with the knowledge that there might be alternate procedures or equipment beyond those in this O&M Program that will adequately accomplish O&M objectives. The work practices included in the O&M Program are based on commonly used practices presently in use. These work practices are not the only successful methods currently available or in use, but were selected as applicable for a wide range of common situations.

Different recommendations, referred to as levels, of the same work practice are provided to accommodate for variations in the type and condition of the asbestos-containing material to be worked on, the building conditions in which the ACBM is located, and the skill level of workers. (Note: The [Name of Facility] APM, at his/her discretion, may

employ outside contractors for any activity.) It is assumed that varying conditions will require

different work practice levels to accomplish the same basic task. Selection of the appropriate levels of work practices should be made by the APM for a project based upon the conditions encountered at each incident. Risk assessments and liability concerns might also influence the selection of the level for a specific work practices.

Assumptions The O&M Program has been developed on the assumption that all asbestos O&M work, at a minimum, will be done in accordance with applicable regulations by persons trained in asbestos in general, and O&M methods, in particular.

Insert here any information regarding asbestos inspections and surveys conducted at the facility.

Related Documents This O&M Program is intended to be used in conjunction with the guide ***Managing Asbestos in Place ("Green Book")*** issued by the EPA in July, 1990, and in compliance with all applicable federal, state and local regulations. The ***Green Book*** explains the objectives and administrative procedures for an O&M Program. This O&M Work Practices Manual provides detailed procedures for conducting O&M work involving ACBM, such as maintenance, repair and minor renovation work. It is expected that many decisions relating to work practice levels might be embodied in the O&M plan for a specific building. In some circumstances, governing regulations may dictate level selection. Information presented in the Green Book is not repeated in this guide but is referenced where appropriate. Additional references might be made to other legal regulations and guidance documents, including:

Statutory & Regulatory Requirements

1. OSHA's asbestos construction, construction safety, personal protection and hazard communication standards
2. OSHA's construction standard for the asbestos industry
3. National Emission Standards for Hazardous Air Pollutants (NESHAP)
4. Asbestos Hazard Emergency Response Act (AHERA)
5. Asbestos Schools Hazard Abatement Reauthorization Act (ASHARA)
6. EPA Worker Protection Rule (WPR)

EPA Guidance Documents

1. Asbestos in Buildings: Simplified Sampling Scheme for Friable Asbestos Materials ("Pink Book")
2. Guidance for Controlling Asbestos-Containing Materials in Buildings ("Purple Book")
3. A Guide to Respiratory Protection for the Asbestos Abatement Industry ("White Book")

A list of references, including the above listed regulations and guidance documents, is given in Appendix "F" of this O&M Program. A summary of the above listed OSHA and EPA regulations is included in Appendix "I" of this O&M Program. State and local regulations, which might be the same as, equivalent to, or more stringent than federal regulations, might also apply. [Refer to State and local regulations here, if applicable. If regulations are referenced include in an Appendix] In addition, generally accepted good construction work practices should be used for all other aspects of O&M activities not specifically mentioned in these work practices.

Types and Locations of Asbestos-Containing Building Materials

Types: The following type(s) of ACBM have been found to be present in [Name of facility]:

1. **Surfacing Material:**

Include the applicable information, or sentence:
Examples confirmed present in [Name of facility] spaces include [types of material(s)]. or This type of ACM was not confirmed present in [Name of facility].

2. **Thermal Systems Insulation (TSI) Material:**

Include the applicable information, or sentence:
Examples confirmed present in [Name of facility] spaces include [types of material(s)]. or This type of ACM was not confirmed present in [Name of facility].

3. **Miscellaneous Material:**

Include the applicable information, or sentence:
Examples confirmed present in [Name of facility] spaces include [types of material(s)]. or This type of ACM was not confirmed present in [Name of facility].

Locations of ACBM:

Include a brief overview of materials and their location(s.)
Example:

Acoustical ACBM Plaster: A survey has identified approximately 24,000 square feet of friable ACBM ceilings in this facility. The ceilings with ACBM are located in the following areas:

- Second floor corridors 2200 and 2400.
- First and Second floor lobbies.
- Emergency stairwell.

ACBM LOCATIONS

ACBM were used in the construction of various areas throughout [Name of facility]. Listed below are the rooms and the areas in the [Name of facility] containing ACBM.

Examples: Room 3001, Basement Pump Room, Wing A entry

O&M Work Practices

General The EPA Green Book provides building owners, managers, workers and other building staff with basic information on how to develop and carry out operations and maintenance programs.

The O&M work practices in this O&M Program are designed to provide detailed and specific guidance to the O&M personnel for conducting maintenance, repair and minor renovation work in accordance with this asbestos O&M program and applicable regulations. The work practices in this O&M Program are designed to reduce or contain materials, dust, or fiber release resulting from work performed on or near asbestos-containing materials. The work practices are also intended to minimize the extent and impact of any releases which do occur. Summaries of each work practice and examples of typical situations that might be encountered are included to assist in the selection of appropriate work practice levels.

The work practices in this O&M Program address most commonly encountered operations and maintenance tasks involving asbestos-containing materials. This O&M Program is not exhaustively complete and does not document or establish a defined procedure for every possible situation. The O&M Program is formatted to present an array of actual conditions which might be encountered. It establishes a logical path to be followed in selecting the most appropriate work practice(s) for a given situation. Staff are often very familiar with actual building conditions and might provide valuable input to the design of actual O&M work. They may also offer suggestions for modifications to specific work practices after the practices have been employed. Any changes to the work practices should be reviewed with the APM prior to incorporation.

As a part of the O&M Program, the APM should review building survey information to determine whether or not a suspect material contains asbestos. If a suspect material which is to be worked on has not been sampled, it should either be sampled and analyzed in accordance with the EPA Protocol or be assumed to contain asbestos and treated accordingly.

O&M Program Assumptions This O&M Program assumes that all elements of an O&M Program listed below have been considered and applicable elements established. References to related information are included in Appendix "F".

- APM appointment and training
- Building inspection and assessment (Appendix J)
- Written building-specific O&M program
- Copies of applicable regulations and guidance documents
- Occupant notification/communication program
- O&M worker, supervisor, and competent person assignments and training program
- Work control/inspection/permit system
- Periodic surveillance program
- Recordkeeping program

- Hazard communication program
- Worker protection program
- Respiratory protection program
- Medical surveillance program
- Asbestos fiber release episode response program
- Air monitoring program
- Waste disposal program
- Historical air monitoring data
- Confined space program
- Safety program for other hazards

All O&M related programs should be reviewed periodically and revised if necessary. Regulatory and guidance documents should also be reviewed periodically to ensure that they are current.

Organization of Work Practices The O&M work practices in this manual are organized according to the type of ACBM that will be affected by the work. ACBM are classified in this manual according to the three (3) categories used by the EPA. This classification system has been widely used in the asbestos industry since the publication of the Asbestos Hazard Emergency Response Act rules (AHERA) in 1987. These categories are:

1. **Surfacing Materials** - materials sprayed or troweled onto building surfaces, such as acoustical materials or fireproofing.

If the building survey and analysis of collected bulk samples confirms this ACBM type to not be present, include the following sentence:

Note: These ACBM types have not been identified at [Name of facility].

2. **Thermal Systems Insulation (TSI) Materials** - pipe, boiler, tank, duct and other insulation applied to components to reduce heat loss, heat gain or condensation.

If the building survey and analysis of collected bulk samples confirms this ACBM type to not be present, include the following sentence:

Note: These ACBM types have not been identified at [Name of facility].

3. **Miscellaneous Materials** - materials such as floor tile, ceiling tile, roofing, cement asbestos products and other materials that are not included in categories 1 or 2 above.

If the building survey and analysis of collected bulk samples confirms this ACBM type to not be present, include the following sentence:

Note: These ACBM types have not been identified at [Name of facility].

Work practices in this O&M Program need to be validated and/or modified for the location(s) where O&M work will be performed. When work is to be performed, the final work practices should be given to workers along with other referenced O&M forms. Repetition of certain steps in different work practice levels is intentional in order to provide consistent and complete information to a worker for a given work practice level.

Work Practice Levels Up to three levels are included for each work practice to address different degrees of potential asbestos fiber exposure. These three levels were judged sufficient (by NIBS in its initial development of the O & M Work Practices Manual) to encompass a broad range of situations involving asbestos control which are likely to be encountered.

A change of level does not imply a different task to be accomplished. It implies a changed potential for asbestos fiber exposure, typically related to either the condition of asbestos or the building context in which the task will be performed.

Examples are provided to assist users in selecting appropriate levels for specific building conditions. Higher levels become more protective and hence more difficult, time consuming and costly to implement. Three levels are not provided for every work practice. If a work practice level is not included, it was deemed unlikely to be encountered under typical conditions. An appropriate work practice level must be selected or created by the APM for each O&M activity that will occur in a facility.

The three work practice levels are defined as follows:

Level 1: Work practice is usually intended to avoid a disturbance of ACBM and release of asbestos fibers, but if ACBM are disturbed, it is likely that worker and building occupant exposures will be minimal.

Level 2: Work practice is likely to, or intended to, disturb small amounts of ACBM for short periods of time. Worker protection and localized engineering controls are justified, but the disturbance is unlikely to create building occupant exposure or impact the building environment.

Level 3: Work practice is intended to disturb small amounts of ACBM in ways sufficient to justify engineering controls, and protection of workers, building occupants and the building environment.

While these activities are most likely to be performed by qualified trained outside asbestos abatement contractors, this document is intended to set the standard by which either and outside contractor or in house staff will perform this work. Therefore, all three levels are defined in this section of the O&M Program.

NOTE: Use of outside contractors to perform asbestos O & M work practices should be confirmed. If building staff will perform the work practices, the sentence(s) may require rewording. No revisions are necessary to the work practices based on who performs the work.

A "disturbance" of ACBM, as used in the level definitions, refers to any activity that disrupts the matrix of ACBM, or generates visible debris, or disturbs visible debris.

Figure 1: Guidelines for 3 Levels of Work Practices, which follow, summarize the engineering controls and practices recommended for each level. The APM should determine the appropriate level, based on the O&M program objectives, the O&M program elements, and level of training needed for each level of work practices used in [Name of Facility].

Figure 1: Guidelines for 3 Levels of Work Practices

ITEM (General Procedure Reference)	Level 1[1]	Level 2[1]	Level 3[1]
Fiber Release Potential	Low/Minimal[1]	Moderate	High
Training (APM5)[2]	Awareness/O&M[3]	O&M	O&M
HVAC System Off (W3)	NO[4]	YES	YES
Vacate Area (W4, APM2)	NO	YES	YES
Critical Barriers (W4)	NO	NO[5]	YES
Delineated Work Area (W4)	NO	YES	YES
Respiratory Protection (W5)	NO[6]	YES[7]	YES
Protective Clothing (W6, W14)	NO[8]	YES	YES
Initial Monitoring (W7)	NO[9,10]	YES[9,10]	YES[9,10]
Periodic Monitoring (W7)	NO[10]	YES	YES
Preclean (W8)	NO	As Needed[11]	As Needed[11]
Use HEPA Vacuum (W8)	As Needed[11]	YES	YES
Wet Methods (W8)	As Needed[11]	YES	YES
Work Area Protection (W9)	NO[12]	Drop Cloth, Glovebag	Mini-Enclosure, Negative Pressure System[13]
Local HEPA Exhaust (W9)	NO	As Needed[11]	As Needed[11]
Lockdown (W10)	NO	YES[11]	YES[11]
Area Decontamination (W11)	NO	YES	YES
Visual Inspection (W12)	NO	YES	YES
Air Clearance (W12)	NO[14]	NO[14]	YES
Personal Decontamination (W15)	NO[15]	YES	YES

NOTES

1 The exact meaning of these three levels will vary depending upon the exposure objectives which are specified in the design of the O&M plan for a specific building (see Design & Validation of An O&M Plan for further explanation). State of [name of state] and local requirements may be more stringent than these guidelines.

2 The general procedures in parentheses provide additional information on the noted item.

3 Training should be appropriate to the type of ACBM, building conditions, and the work to be performed. If ACBM may be or will be disturbed, O&M training may be necessary.

4 Turn off HVAC if work will be performed on HVAC system(s).

5 Critical barriers may be necessary or be required for specific cases by the APM.

6 The OSHA asbestos standard, Appendix "G", states that maintenance staff employees should be instructed not to remove ceiling tiles below ACBM without wearing the proper respiratory protection, clearing the area of other people, and observing asbestos waste disposal procedures. Appendix "E" of the Green Book recommends that respirators be worn for routine maintenance work where there is a reasonable likelihood of ACBM disturbance. For routine maintenance work where contact with ACBM are unlikely, appendix E recommends "No respiratory protection required. (Air-purifying respirators with high-efficiency filters should be available if needed; half-face or full facepiece)." EPA advises building owners that these recommendations go beyond OSHA requirements.

7 Respiratory protection can be deleted if supported by adequate exposure data in accordance with the OSHA regulations.

8 Protective clothing should be available and is required by OSHA if exposure is over permissible exposure limit.

9 Monitoring is required by OSHA if ACBM are disturbed.

10 Monitoring may be deleted if supported by statistically reliable historical data in accordance with OSHA regulations.

11 May be recommended - see work practices. Adequate training is necessary.

12 Drop cloth optional for dirty tools, equipment and/or waste.

13 Work area protection may be revised if alternate methods are used and historic data are available.

14 Air clearance depends on air monitoring program requirements.

15 Personal decontamination may be required by APM or O&M program.

Validation

OSHA Exposure Requirements Establishing limits on airborne asbestos is necessary to properly control the exposures to which maintenance workers and building occupants may be subjected. As a minimum, the requirements of the OSHA regulation must be met. OSHA requires that air monitoring be performed to determine what level of worker protection is necessary. OSHA specifies requirements for the determination of airborne fiber levels and worker exposures in the Code of Federal Regulations (29 CFR 1926.58 (f)). OSHA requires employers to determine initially the level of airborne fibers to which an employee will be exposed through "initial monitoring" or the use of historical data.

OSHA then requires periodic monitoring unless supplied air respirators are used. Finally, additional monitoring is required (unless supplied air respirators are used) whenever a change in workers, the activity, or equipment use occurs which might result in exposures above the permissible exposure limit, action level and/or excursion limit.

These air monitoring requirements provide building owners and managers with the information necessary to determine what level of protection is required by the Federal Government. Regulations do not set precise standards for the protection of building environments.

Exposure Monitoring at [Name of facility]. Exposure monitoring is necessary to validate that each work practice level results in airborne asbestos concentrations which are less than 0.01 f/cm^3. O&M work practices should be monitored by an air monitoring consultant (independent of the contractor performing the work practices) to determine that the 0.01 f/cm^3 level has not been exceeded. Each level of each work practice is to be monitored on the first three uses of that practice and periodically at every sixth use thereafter. These air monitoring readings will constitute historical data and will serve to document that the limit is not being exceeded by the various work practices and levels. Respirators shall be used until work practices and levels are validated.

Higher levels recorded will require the APM to revise methods, procedures and, possibly, levels of work practice until the set limit of 0.01 f/cm^3 is not exceeded.

Airborne Asbestos and Levels of Work Practice To fit within the level categories as defined in O&M Work Practices (page 10), the following must hold true:

Level 1 *(No Worker or Area Protection) work practices should not result in elevated airborne asbestos levels.*

Level 2 *(Worker Protection, with Minimal Area Protection) work practices may result in localized elevations of airborne asbestos levels that will only affect the worker, but not the building environment.*

Level 3 *(Worker and Area Protection) work practices may, if uncontrolled, result in elevations of airborne asbestos levels that are sufficient to require worker protection and isolation of the work area from the rest of the facility.*

Under EPA's Monitoring Program, to obtain O&M clearance after Level 2 and 3 work, the following procedures are proposed:

1. Personal monitoring should consist of samples to obtain an 8 hour time-weighted average (TWA), if possible, and excursion limit (EL) monitoring samples

2. Analysis by PCM

3. Analysis by TEM of 20% of air tests taken as a validation check.

Full air clearance by TEM as set forth by AHERA is required only for schools, but can be used in non-school buildings, and is recommended for removal projects involving large quantities of surfacing material, i.e., fireproofing, acoustical plaster, etc.

Aggressive air sampling techniques should be used only when the test area is contained. Aggressive disturbance of open areas should <u>not</u> be undertaken.

Training The amount and content of worker training should correspond to the type, condition and quantity of ACBM that the staff will encounter in the course of their work. Training should emphasize hands-on methods. The workers should learn how to use the O&M Program as well as to perform specific tasks.

The APM should have training sufficient to evaluate potential exposure, understand building components, building systems, building usage patterns, designing and conducting O&M activities, be familiar with cleaning and maintenance tasks, understand applicable laws and regulations, and be aware of other crucial factors associated with an O&M Program. The APM must be properly qualified, through training and experience, and be actively involved in all asbestos control activities. The APM shall attend the following two courses to fulfill the asbestos safety and management training described above:

1. Contractor/Supervisors: a 5-day training course that includes at least 14 hours of hands-on training, individual respirator fit testing, course review, and a written examination. Hands-on training must permit supervisors to have actual experience performing tasks associated with asbestos abatement, including O&M activities.

2. Project Designer: a 3-day training course that includes lectures, demonstrations, a field trip, course review and a written examination.

The Asbestos Program Coordinator (APC) shall have training and experience similar to the APM, and shall attend the following course to fulfill the necessary asbestos safety and management training described above:

1. Contractor/Supervisors: a 5-day training course that includes at least 14 hours of hands-on training, individual respirator fit testing, course review, and a written examination. Hands-on training must permit supervisors to have actual experience performing tasks associated with asbestos abatement, including O&M activities.

Asbestos Inspectors shall attend the following course to fulfill the asbestos safety and management training described above:

1. Inspector: a 3-day inspector training course that includes lectures, demonstrations, 4 hours of hands-on training, individual respirator fit-testing, course review and a written examination. Where appropriate, audio visual materials and aids should be used to complement lectures. Hands-on training should include conducting a simulated building walk-through inspection.

The OSHA Construction Standard for the Asbestos Industry indicates that for asbestos related work involving 100 square feet or more of asbestos-containing construction material, a "Certified Supervisor" shall have sufficient experience and authority to take responsibility for the work and a "Qualified Person" must be available to perform the abatement work.

Worker training programs should stress the health risks associated with asbestos exposures. O&M workers need to understand the vital importance of carefully adhering to these work practices or to others which may be specified at a later time.

Asbestos Workers shall attend the following course to fulfill the asbestos safety and management training described above:

1. Worker: a 4-day worker training course that includes lectures, demonstrations and at least 14 hours of hands-on training, individual respirator fit testing, course review and a written examination. Hands on training must permit workers to have actual experience performing tasks associated with asbestos abatement, including O&M activities.

The above training requirements are established and further defined by the Asbestos Model Accreditation Plan (MAP); Interim Final Rule, which was published in the Federal Register on Thursday, February 3, 1994. This amended rule replaces the original MAP found at 40 CFR part 763, Appendix C to Subpart E, in its entirety, and fulfills a part of the mandate contained in section 15 of the Asbestos School Hazard Abatement Reauthorization Act (ASHARA). These provisions of ASHARA were enacted on November 28, 1990, and took effect on November 28, 1992. They served to extend asbestos accreditation coverage to include certain asbestos workers in public and commercial buildings, and stipulated that the minimum number of training hours required for accreditation was to be increased.

This rule amendment, effective April 4, 1994, establishes new training and accreditation standards for state accreditation programs and for the providers of accredited training courses. It further provides for a phased transition to comply with these new standards.

Single copies of this regulation may be obtained by contacting EPA's Toxic Substances Control Act (TSCA) Hotline in Washington, D.C. at (202) 554-1404. Questions regarding the interpretation or application of this rule may be directed to the appropriate EPA Regional Asbestos Coordinator.

Appendix "G" of OSHA standard 29 CFR 1926.58 provides minimum training requirements for maintenance workers where the employer does not establish full scale negative pressure enclosures and does not utilize full scale decontamination.

Use of O&M Work Practices

Lists of Work Practices and Work Practice Summaries Lists of the work practices for [Name of facility] are provided in the Table of Contents for this O&M Program and at the beginning of each section of work practices. The first page of each work practice is a summary of the work practice and lists examples of typical situations, associated general procedures, related work practices and certain basic information about the practices. A recommended minimum number of workers is listed for each work practice. A further discussion of the number of workers for O&M activities is included later in this section.

Selecting Work Practices for [Name of Facility] The APM should select work practices from this manual that are appropriate for the material upon which the work will be performed. The selection of work practices will be based on a variety of factors, including O&M Plan policies and the selection factors listed in this section. If situations exist that are not covered by this manual, the APM should develop work practices appropriate to the situation based on the guidelines in this O&M Program and other applicable sources. It might be desirable to obtain assistance from sources, such as qualified consultants, legal counsel, risk managers or insurance companies when selecting appropriate work practices.

A number of determinations must be made in order to select the appropriate work practice for a given situation. These include:

1. The level of worker and environmental protection desired based on the O&M program objectives.
2. Whether O&M work will be performed by staff personnel or an outside contractor.
3. Regulatory compliance issues for the specific facility and personnel who will perform the work. These include NESHAP, OSHA and EPA requirements for worker protection, work practices, exposure monitoring, notifications and additional state or local requirements.
4. Whether exposure monitoring data and work evaluation forms (see Appendix "C") from past work indicate that a given work practice or work practice level accomplishes the O&M objectives.

Using the Work Practices The APM will select the work practices to be used. A decision tree illustrating this selection process is shown in Figure 2 Work Practice Selection. Guidance for selecting the appropriate work practice level is shown in Figure 1.

The process of using work practices from this O&M Program, or alternatives based on this manual, for a given situation can be summarized as follows:

1. A Job Request Form (Appendix "A") should be completed for work that could disturb ACBM. *(Note to APMs: If the required work has been performed in the past, it might not be necessary to complete an APM checklist for each O&M activity. Past checklists can be reused for the selection of work practices.)*

2. The APM should complete an APM checklist (Figure 3 APM Checklist) and evaluate the work to be performed based upon the information on a completed Job Request Form, available survey and assessment data, and data on past O&M activities (if available). When reviewing data and completing the APM checklist, the following should be determined:

   - Whether the job requested is actually an asbestos O&M activity.
   - The category(ies) of ACBM that might be encountered during the work.
   - The appropriate work practice(s) to address the situation. The work practice summaries include a section of "related work practices" that are intended to aid the APM in the selection of the proper work practice.
   - The appropriate level of work practice(s) to be used.
   - Personal protective equipment, if any, for the work.

3. All of the above information should be recorded on a Maintenance Work Authorization Form (see Appendix "B"). The completed APM checklist should be signed, dated and filed.

4. Copies of information as listed on the APM checklist should be provided to the workers who will perform the work, along with the appropriate work practice checklist. If repetitive O&M activities using the same work practices will be performed in sequence over a short period of time, a single Maintenance Work Authorization Form may be completed to cover these situations for a single building. Note, however, that the NESHAP requirements apply to a facility if the combined additive amount of Regulated Asbestos Containing Material (RACM) that will be removed or stripped in repetitive activities exceeds the quantities specified in NESHAP.

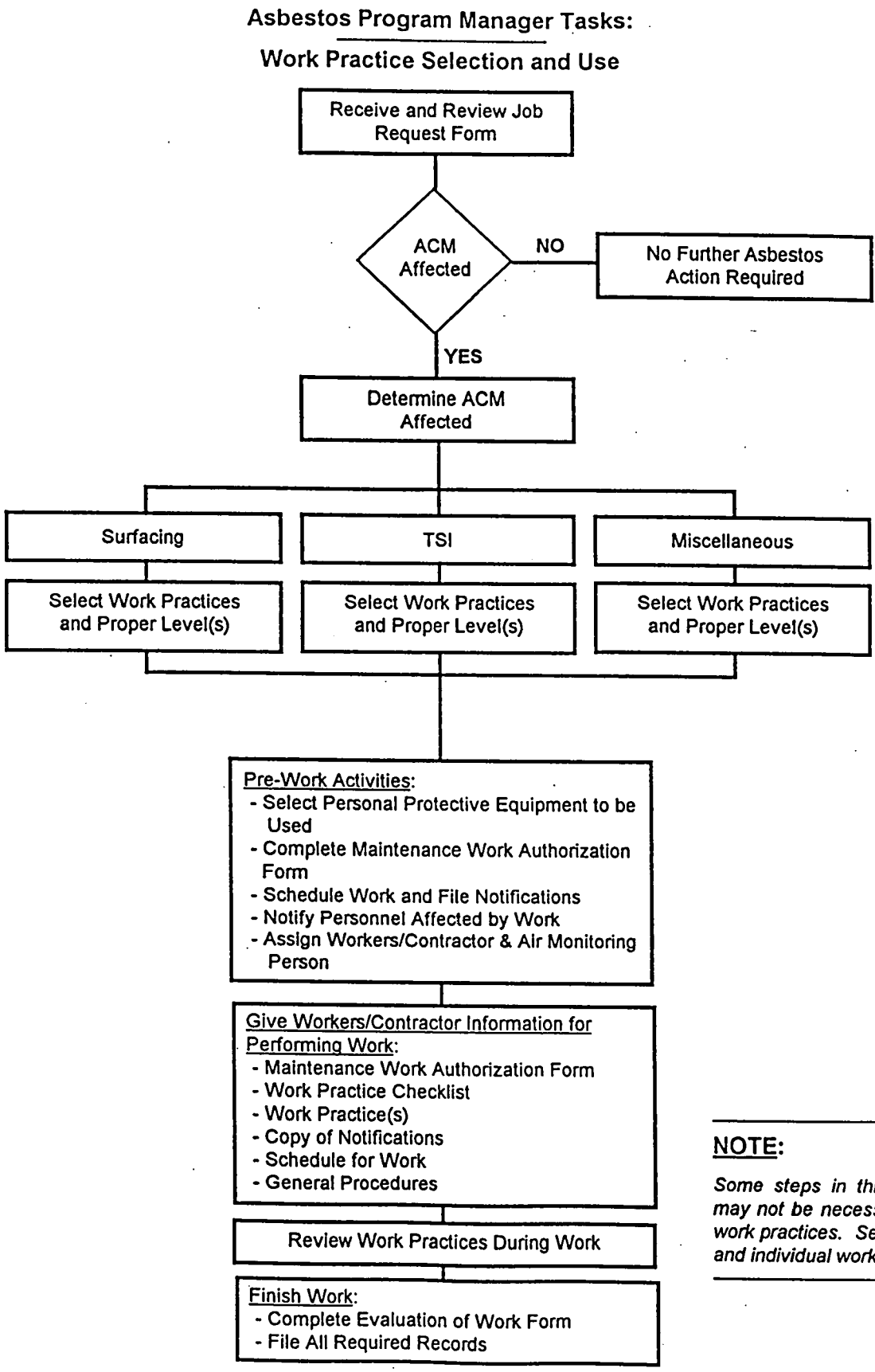
   Repetitive tasks might increase exposure levels such that more stringent OSHA worker protection and engineering control requirements are triggered. Caution should be used to insure each of the repeated O&M activities is a discrete O&M activity. O&M work procedures are based on disturbing a small amount of material over a short period of time. Care must be taken to avoid violating the intent by allowing contiguous activities that add up to a larger scale procedure and a potential accumulation of contamination. If a number of O&M activities need to occur at one time in one location, it might be preferable to treat the work as a larger scale, non-O&M activity. The APM can set limits appropriate for a facility and O&M program that are based on quantities of ACBM to be potentially disturbed in single and multiple O&M activities. Exposure monitoring procedures and methods for repetitive activities might need to be more stringent than for single activities.

   The forms used in Appendices "A", "B" and "C" of this O&M Program are reproduced from the EPA Green Book for use or guidance.

Figure 2

Figure 2 is not on diskette; however, a copy of Figure 2 is provided in the front pouch of this notebook for your use. A copy of this sheet will need to be sent through the printer to add the title and footer, which is found in file FIG-2.WPF on the diskette.

Figure 2: Work Practice Selection



NOTE:

Some steps in this process may not be necessary for all work practices. See Figure 2 and individual work practices.

Work Practice Level Selection Factors The work practices included in this O&M Program are specifically for [Name of Facility]. The work practice levels do not directly correspond to any specific regulatory requirement. OSHA regulations are triggered by disturbance of asbestos, and require that certain engineering controls, work practices, personal protection and administrative procedures be used depending on whether the permissible exposure limit (PEL), action level (AL) or excursion limit (EL) will be exceeded, or can reasonably be expected to be exceeded, during the work. In a facility where the combined additive amount of RACM to be removed or stripped during a calendar year exceeds the EPA NESHAP requirements, environmental agencies must be notified and area and environmental controls are required. State of [name of state] and local regulations may be more stringent, and will apply. Appendix "I" includes more information on OSHA and EPA regulations.

Users of this manual might have operations and maintenance program objectives which are more protective than the minimum regulatory requirements. Accordingly, it might be appropriate, in the selection of work practice levels, to consider more than just the OSHA regulated exposure levels. The conditions of the building and the O&M program objectives will dictate the work practice level necessary.

More specifically, the following are factors for evaluation by a properly trained Asbestos Program Manager when selecting work practice levels:

- Fiber release potential of material or O&M activity
- Condition and friability of ACBM
- Exposure and air monitoring data
- Training, skill and experience of workers
- Quantity of ACBM to be disturbed
- Type and percentage of asbestos
- Location and use of ACBM
- Exposure potential for occupants and other personnel
- Federal and state regulations
- O&M and other management policies
- HVAC and ventilation system configurations
- On-site supervision

Definitive quantities of ACBM to be affected have not been specified in the work practice level examples. This is to provide greater flexibility and to emphasize that other factors might influence level selection by the APM. The APM's determination of the appropriate level should be based, at least in part, upon the quantity of ACBM to be disturbed. The work practices are generally designed for disturbing small amounts of asbestos as required to perform O&M tasks.

In instances where ACBM will be disturbed, OSHA requires that personal air monitoring of workers be performed for work practices unless employee exposures, as indicated by statistically reliable measurement, are below the OSHA action level and/or permissible exposure limit (see OSHA regulations for details). O&M workers who could disturb ACBM should use respiratory protection and other protective measures, unless adequate data

are generated that indicate exposure levels in compliance with the O&M program objectives.

Validation of the work practices is necessary to determine if a work practice is appropriate for use under the O&M conditions present in a given facility. Data generated can be used by the APM during future selection of work practice levels. If O&M activity data are to be used to qualify for OSHA historical data exemptions or for maintaining OSHA exposure records, it is necessary that the information be kept in strict accordance with the requirements of the OSHA construction standard (29 CFR 1910.20). The employer is responsible for proving compliance with all applicable Federal, state and local regulations. Based upon the data obtained, the APM might decide to use a higher or lower level of work practice for a specific task. Substantially more data are required to justify the use of lower level work practices. Any data indicating higher exposures than anticipated warrant consideration of moving to higher level work practices. Work practice levels may be modified as noted in Figure 1 based upon historical air monitoring data (additional information on historical data is provided in General Procedure APM6).

Number of Workers Each work practice summary includes a recommendation on how many workers are needed to perform the O&M activity(ies). A number of factors should be considered when determining how many workers are to be assigned to perform an O&M activity, such as:

- Regulatory requirements
- The amount of work to be done (quantity of ACBM to be disturbed, or likely to be disturbed)
- Accessibility to the work area (height, enclosure)
- Worker skill, training and experience
- Weight, size or length of objects involved in the work
- Worker safety or degree of risk
- Work efficiency and cost effectiveness

One worker is recommended where the work practice can be accomplished safely and effectively with one worker. Two or more workers are recommended for O&M work practices involving enclosures or where special conditions or other factors complicate the work. General Procedure APM5 includes additional information on assigning workers.

Work Practice Checklists The work practice selection process outlined above and additional information related to the selection and use of the work practices are compiled on the "Asbestos Program Manager Checklist" shown in Figure 3.

Checklists to be used by workers for each level of work practice are shown on "Worker Checklists" in Figures 4, 5 & 6. A checklist is to be provided to the worker with each work practice in order to give the worker complete information required to perform the work.

II

Section II Asbestos Program Manager (APM) General Procedures

Designation of the facility's Asbestos Program Manager (APM) is a most important element in the development of a comprehensive O&M Program. This person should be experienced and trained in O&M practices (and abatement) of asbestos-containing materials.

If, for any reason, the appointed APM must be changed, the following page naming the APM should be revised, and all interested parties advised in writing.

Section II Asbestos Program Manager (APM) General Procedures

The Asbestos Program Manager (APM) for EPA occupied spaces in [Name of Facility] is identified as follows:

Name	[ ]
Title	[ ]
Company	[ ]
Address	[ ]
	[ ]
Telephone	[ ] Ext. [ ]
Alternate telephone	[ ] Ext. [ ]
After hours telephone	[ ] Ext. [ ]
Emergency telephone	[ ] Ext. [ ]

This person will be referred to in this O&M Program as the APM.

If the lease arrangement for this EPA occupied or controlled facility requires the appointment of an Asbestos Program Coordinator (APC), EPA's point of contact in [Name of Facility] is identified as follows:

[Name of Contact]
[Title]
[Division]
[Organization]
[Telephone number]

[Name of Contact] will be the point of contact for the APM to the EPA concerning O&M activities in EPA leased spaces within [Name of Facility].

The APM or a designee should review work practices with the workers who will perform the work. Workers should be notified to consult with the APM or designated person if they have any questions during the work, if any problems occur, or if it appears to the workers that additional precautions might be necessary to safely perform the work.

This section includes detailed procedures for steps that are common to many of the work practices. These general procedures are referenced in the work practices and in the APM checklist. The general procedures should be covered in O&M training related to the use of this manual.

Not all of the general procedures are used in every work practice. The work practices and checklists refer the user to applicable general procedures for detailed information on how to perform a certain portion of the work. Once a user is familiar with the general procedure requirements, it might not be necessary to review the general procedures each time an O&M activity is performed. However, the general procedures should be reviewed periodically by the APM to verify that the proper procedures are being followed.

Users of the O&M Work Practices Manual should also review the General Safety Considerations information in Appendix "G".

APM	Checklist (Figure 3)	3
APM1	Selection of Personal Protective Equipment & Decontamination Procedures	4
APM2	Work Scheduling	5
APM3	Federal, State and Local Notification	6
APM4	Notification of Personnel	7
APM5	Assigning Workers	7
APM6	Developing the Air Monitoring Program and Assigning Air Monitoring Personnel	8
APM7	Recordkeeping	11
APM8	Confined Spaces	12
APM9	Selection of Materials	13
APM10	Emergency Work and Dry Removal	14
APM11	Inspecting Buildings for Asbestos-Containing Building Materials	15

Note: Not all of the general procedures are used in every work practice.

Figure 3: APM Checklist
Asbestos Program Manager (APM) Checklist for Operations and Maintenance Work Practice Use

- ☐ Receive and review Job Request Form - See Appendix "A".
  Work to be performed: _____
  _____
- ☐ Review or request survey data to determine whether ACBM are affected.
- ☐ Complete Maintenance Work Authorization Form, including: - See Appendix "B".
  - ☐ Review historical air monitoring data for work practices to be used.
  - ☐ Work Practice(s) selected for all ACBM to be encountered - See Section I - Figures 1, 2.
  - ☐ Select personnel protective equipment and decontamination requirements to be used, if needed - See General Procedure APM1.
  - ☐ Select appropriate materials and review potential hazards (confined spaces, scaffold use, etc.) - See General Procedures APM8 & APM9.
- ☐ Schedule work when area is not in use or plan developed to isolate area (if necessary) - See General Procedure APM2.
- ☐ Federal, state and local notifications filed (if applicable) - See General Procedure APM3.
- ☐ Notify personnel affected by work - See General Procedure APM4.
- ☐ Assign workers (or contractor) with appropriate level of training. Verify currency of training, fit tests, and medical surveillance - See General Procedure APM5
- ☐ Assign trained air monitoring person and determine air monitoring to be performed (if needed). Record air monitoring requirements on Maintenance Work Authorization Form - See General Procedure APM6.
- ☐ Provide copies to workers/contractor of:
  - ☐ Maintenance Work Authorization Form
  - ☐ Work practice checklist for proper work level.
  - ☐ Work practice(s): _____
  - ☐ General Procedure(s)
  - ☐ Notifications
  - ☐ Schedule of work
- ☐ As practical, review work practices during work for compliance with requirements and worker general procedures.
- ☐ Complete Evaluation of Work Affecting ACBM form - See Appendix "C".
- ☐ File all required records in proper files - See General Procedure APM7.

☐ Signature: _____ Date: _____

If information in any of these sections is found not to be applicable in the facility please make the following notation:

APM[#] [Name of Section] - Not applicable.

It is unlikely, however, that any of these topics would, or should be deleted.

APM 1 **Selection of Personal Protective Equipment & Decontamination Procedures**

Selecting personal protective equipment (PPE) for O&M work includes the selection of respirators, protective clothing, gloves, boots, hardhats, and/or other equipment that might be necessary for a specific task. The information in Appendix "G" discusses general safety considerations that may affect equipment selection.

Respirators used for O&M activities must be selected based on the requirements of regulations and a Respiratory Protection Program developed in accordance with OSHA standard 29 CFR 1910.134 or the EPA "Worker Protection Rule" (40 CFR 763.120,121), as applicable, for the O&M workers. Appendix "E" of the Green Book includes EPA's recommendations on the types of respirators to be used for custodial and maintenance tasks. Liability concerns, historical data and management policies might also influence whether respirators are used, and if so, the type of respirators for O&M activities. NIOSH recommends minimizing occupational exposure to cancer producing sub-stances, such as asbestos to the lowest feasible level. In practice, a maximum exposure level for workers of 0.01 fibers per cubic (0.01 f/cc) centimeter of air inside the respirator is commonly used when respirators are selected using protection factors.

OSHA has stated that the OSHA permissible exposure limit was selected as a technical and economic compromise for industry, and is not designed to totally prevent cancer causing exposures. The EPA's White Book and the Introduction and Section 01562 of the NIBS Asbestos Abatement Guide Specification contain information regarding respirator selection that might be helpful to the APM. Review of this additional information is strongly encouraged.

In certain situations, full face respirators might be desirable to provide additional eye and face protection for workers. Powered Air Purifying Respirators (PAPR's) are preferred by many workers instead of negative pressure respirators. OSHA regulations 29 CFR 1910.1001 and 29 CFR 1926.58 require that an employer provide a PAPR in lieu of a negative pressure respirator if an employee chooses to use this type of respirator.

Depending upon the type of work and work practices to be used, combination respirator filter cartridges or a different type of respirator might be necessary to protect workers from other contaminants or hazardous substances. Respiratory protection for asbestos work requires the use of high efficiency particulate air (HEPA) filter cartridges.

Protective Clothing & Decontamination Procedures Protective clothing for O&M work typically consists of disposable coveralls, gloves and/or boots. Protective clothing for O&M work can be selected by the APM or the worker, depending upon the O&M procedures. Protective clothing options that are typically used are discussed in Worker General Procedure W6. The protective clothing option selected might depend in part upon the decontamination procedures to be used and the type of work area preparation or enclosure.

Decontamination procedures typically used for O&M work include HEPA vacuuming on a drop cloth, changing in a change room, or showering. Worker General Procedure W14 explains the decontamination process for each option.

The APM might also determine whether boots, gloves, hardhats or other protective equipment is needed for O&M tasks. Protective clothing selections made by the APM should be recorded on the Maintenance Work Authorization Form.

APM 2

Work Scheduling Level 2 and 3 work should be scheduled for a time when the work area will not be in use and can be closed off to anyone other than trained workers, or other authorized personnel. If an area is always occupied, plans should be made to isolate the work area from building occupants using visual and/or physical barriers. If a special work area arrangement is required, it might be beneficial to provide a sketch to the workers showing how the area is to be set up. If respirators are used for Level 1 activities, it might be desirable to vacate the area to avoid concerns resulting from a worker in a respirator working within sight of unprotected workers/occupants.

Scheduling of work might be affected by notification requirements. All notification requirements should be met before work is scheduled. Under certain circumstances, some emergency work can be performed prior to the filing of a notification. Review regulations and contact federal, state of [name of state] and local regulatory agencies concerning notification requirements for emergency work.

APM 3 **Federal, State and Local Notifications** The APM, or his designee, should file all notices required by federal, state of [name of state] and local regulations prior to the start of any O&M activities that are governed by these regulations.

Federal Notifications Federal requirements for notification are set forth in the National Emission Standards for Hazardous Air Pollutants (NESHAP) rules and the EPA Worker Protection Rule. OSHA is considering adding notification requirements to the OSHA regulations. For demolition and renovation work, the latest NESHAP revisions are contained in 40 CFR 61.145 (a) and (b). A ten working day federal notification is required for renovation work if the combined amounts of regulated asbestos-containing material (RACM - see glossary or NESHAP for definition) to be stripped, removed, dislodged, cut, drilled or similarly disturbed is over 260 linear feet (80 linear meters), 160 square feet (15 square meters) or 35 cubic feet (1 cubic meter) for any single project.

Also, if the combined estimated quantities of RACM to be removed or stripped in individual nonscheduled operations during a calendar year (January 1 through December 31) exceeds the amounts listed above, a NESHAP notice must be submitted at least ten working days before the end of the calendar year (e.g. December 15) preceding the year for which notice is being given. A new written notice must be filed with the EPA if the start date for a project is revised (earlier or later) from the date filed in the original or a previous notice. A notice must be updated if the amount of asbestos affected changes by 20 percent or more.

If wetting of RACM during removal would unavoidably damage equipment or present a safety hazard, written approval from the EPA is required for alternative emission control methods (dry removal).

The NESHAP notification requirements for emergency renovation work are set forth in 40 CFR 61.145 (a) and (b). More information on emergency work is included in General Procedure APM10.

See Appendix "H" (2.B and 2.D) of this manual and the NESHAP regulations for details on Federal notification requirements. OSHA's proposed regulatory changes include adding notification requirements in the OSHA regulations. Requirements of state of [name of state] and local regulations should also be included in this section.

Insert here any specific state or local regulations; or refer the reader to the appropriate appendix to this manual. It is suggested that a summary be included here, and that any copies of state and local regulations be included under an appendix.

State and Local Notification Requirements State and local notification requirements vary greatly. Many states and localities have notification requirements that are more stringent than the federal requirements. State and local requirements concerning permits for any repair or renovation work must be reviewed. State of [name of state] and local requirements must be complied with before work is scheduled and commenced. See Appendix "F" for the EPA Regional Contacts, which provide information on obtaining copies of state and local regulations.

APM 4

Notification of Personnel Persons who use, occupy, or are affected by an area where ACBM work will occur should be notified prior to the start of the work. Proposed changes to the OSHA regulations include mandatory notification of certain personnel prior to the performance of work regulated by OSHA. Notification of personnel is usually not necessary for Level 1 O&M activities. Personnel should be given information about the specific work to be performed, the work schedule, precautions being taken, what will be visible during the work, and that posted warning signs must be obeyed. Section 4 of the Green Book includes information on occupant, tenant and worker notification of the presence of ACBM that might be helpful to the APM.

If O&M work occurs frequently, or for Level 1 Tasks where notification is needed, a general notice to affected personnel might be more convenient than notifying these personnel each time work occurs. State of [name of state] and local regulations may also include personnel notification requirements.

If applicable, include here any specific regulation information; or refer to an Appendix.

APM 5

Assigning Workers assigned to perform O&M work should have training and experience in the skills and techniques required by this Program for the type of work to be performed, training in applicable asbestos O&M procedures, the O&M plan for the facility, and site-specific building conditions.

The OSHA construction standard contains minimum training requirements for construction workers (including maintenance workers) exposed at or above the action level. Appendix "G" of OSHA standard 29 CFR 1926.58 provides minimum training requirements for maintenance workers where the employer does not establish full scale negative pressure enclosures, and

does not utilize full scale decontamination. State of [name of state] and local regulations may impose training requirements for O&M activities. Verify that state of [name of state] and local requirements are met before scheduling work. Additional training might be desirable for performing frequent O&M work or certain O&M tasks. Before workers are assigned to O&M work, the APM should verify that their training, respirator fit tests and medical surveillance are current and in compliance with regulations (where applicable) and the requirements of work practices to be used. Appendix "F" in this manual gives guidance on where to find applicable regulatory information and Green Book guidance on these topics.

If applicable, include here any specific regulation information; or refer to an Appendix.

Depending upon applicable regulations (such as NESHAP), a designated trained or "competent person" might be required to perform or supervise certain aspects of the work. Section 4 of this manual discusses factors to consider when determining the number of workers required for an O&M activity. Once workers are selected for a task, the APM should review the work practice with the workers, if needed.

APM 6 Developing the Air Monitoring Program and Assigning Air Monitoring Personnel

Note: This section is not intended as a substitute for a complete Air Monitoring Program that is needed for O&M work. This section notes only general air monitoring issues that the APM needs to address for O&M work.

Some states or local authorities require certification or specialized training of air monitoring firms and/or air monitoring personnel. The writer should verify state and local requirements and inset here a summary, and under an Appendix a copy of any rules, regulations or guidelines.

Owners might choose to use an outside consultant to perform air monitoring for O&M activities. In certain cases, where frequent O&M activities are performed, the O&M program might include having one or more designated trained workers perform air monitoring during O&M activities. In either case, an Air Monitoring Program should be developed by the air monitoring personnel or consultant and the APM for O&M activities. The

Air Monitoring Program should specify when air monitoring will be performed, the types of monitoring (personnel, background, area, clearance, periodic, and/or initial), analysis methods, training requirements for monitoring personnel, and procedures for maintaining data from O&M activities, including any data required for OSHA historical data monitoring exemptions. Air monitoring data should be considered when selecting the type of respirators for activities that use respiratory protection.

Training might be required by the Air Monitoring Program or state or local regulations, and could include a NIOSH air monitoring course, industrial hygiene training or other requirements. Training for persons performing air monitoring work should include hands-on training with the equipment to be used. Training for air monitoring that is currently available consists primarily of courses meeting the National Institute for Occupational Safety and Health (NIOSH) 582 requirements.

Air monitoring exemptions or requirements for a given work practice should be based on the Air Monitoring Program and stated on the Maintenance Work Authorization Form.

Exposure monitoring should be addressed in the Air Monitoring Program and is required for operations covered by OSHA regulations. Review the applicable OSHA standards in detail when developing air monitoring procedures for O&M work. Sections O&M work include those on initial monitoring, historic data and periodic monitoring:

Initial monitoring is discussed in paragraph (f)(2) of OSHA standard 29 CFR 1926.58:

> "**Initial monitoring.**(i) Each employer who has a workplace or work operation covered by this standard, except as provided for in paragraphs (f)(2)(ii) and (f)(2)(iii) of this section, shall perform initial monitoring at the initiation of each asbestos, tremolite, anthophyllite, actinolite job to accurately determine the airborne concentrations of asbestos, tremolite, anthophyllite, or actinolite to which employees may be exposed."

Data generated by exposure monitoring performed in accordance with OSHA requirements may be used for historical data initial monitoring exemptions. The OSHA requirements for exposure monitoring data under the Construction Industry Asbestos Standard (29 CFR 1926.58) are specified in paragraph (f)(2)(iii):

> "Where the employer has monitored each asbestos, tremolite, anthophyllite, or actinolite job, and the data were obtained during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work

practices, and environmental conditions used and prevailing in the employers current operations, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraph (f)(2)-(i) of this section." (Paragraph (f)(2)(i) is the initial monitoring requirement.)

OSHA then requires periodic monitoring unless supplied air respirators are used. Periodic monitoring is discussed in paragraph (f)(3) of OSHA standard 1926.58:

> "**Periodic monitoring within regulated areas.** The employer shall conduct daily monitoring that is representative of the exposure of each employee who is assigned to work in a regulated area. Exception: When all employees are equipped with supplied-air respirators operated in the positive pressure mode, the employer may dispense with the daily monitoring required by this paragraph."

Termination of monitoring is discussed in (f)(4) of OSHA standard 1926.58:

> "**Termination of monitoring.** If the periodic monitoring required by paragraph (f)(3) of this section reveals that employee exposures, as indicated by statistically reliable measurements, are below the action level, the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring."

Once data are generated for a certain work practice in a given facility, the APM should be able to judge whether that level of work practice is appropriate for O&M work in that facility and whether more air monitoring is necessary. In certain situations (i.e. removals of resilient floor coverings using manufacturer's recommended practices), OSHA has allowed the use of data generated by third party manufacturers to support a claim for an exemption from initial air monitoring. Personal air monitoring is required following changes in work practices, employees, employee skill levels, or other pertinent factors which could lead to the OSHA action level or exposure limits being exceeded. Validation of the work practices using air monitoring data applies only when the OSHA monitoring requirements listed above are met. Personal monitoring should consist of samples to obtain an 8 hour time- weighted average (TWA), if possible, and excursion limit (EL) monitoring samples. All analysis for OSHA compliance should be by phase contrast microscopy (PCM). Transmission electron microscopy (TEM) analysis will distinguish asbestos fibers from other fibers and might also be used if desired, although PCM data is required by OSHA. TEM data cannot substitute for OSHA required PCM data unless approved by the local OSHA office. The use of TEM analysis or settled dust sampling to evaluate the need for precleaning prior to an O&M activity might be considered. Neither method is required by current regulations.

This document does not take a position on the efficacy of settled dust sampling, nor advocate its use. It is presented here as an available analytical tool that might be used. Settled dust sampling can also be used during O&M activities to document disturbances during the activity. Settled dust sampling might be used as part of a clearance protocol for O&M work. No regulatory standards for dust sampling exist at this time. The APM might want to consult with an experienced laboratory or consultants regarding the latest settled dust sampling procedures and protocols. Procedures commonly in use include microvacuuming, surface wipe samples, and tape lift methods.

APM 7 **Recordkeeping** The following records of O&M work shall be retained in permanent files:

- Inspection and Assessment Reports
- A copy of the O&M Program (initial program and all updated versions)
- The Work Practices Used
- Respiratory Protection Program
- Fiber Release Reports
- Job Request Forms
- Maintenance Work Authorization Forms
- Evaluations of Work Affecting ACBM
- Reinspection/Periodic Surveillance Reports

For employers with employees engaged in asbestos-related work, federal regulations require that the employer retain:

- Personal Air Sampling/Exposure Monitoring Records
- Historical Data (used to qualify for exemptions from OSHA's initial monitoring requirements)
- Medical Records (for employees subject to a medical surveillance program)
- Employee Training Records
- Fit Test Records (for employees that use respirators)

This O&M Program also requires that records be maintained for:

- Waste Tracking and Disposal - See Appendix "D".
- Air Monitoring Data
- Qualifications and Performance Records for Outside Contractors performing O&M work

If settled dust sampling is used it is advisable to maintain these records also.

OSHA requires that employers provide to each employee their record of exposure and medical surveillance under the Records Access Standard (29 CFR 1910.20) and the Hazard Communication Standard (29 CFR 1910.1200 & 1926.59). Also see the OSHA Asbestos Construction Rule (29 CFR 1926.58), the EPA Worker Protection Rule (40 CFR 763 Subpart G) and the Green Book for details on recordkeeping requirements.

Note that state of [name of state] and local regulations may require that additional information be recorded and retained.

If applicable, include here any specific regulation information or refer to an Appendix.

The building owner shall make available all written elements of the O&M program to the building's O&M staff as well as to tenants and building occupants, if applicable. Building owners are also encouraged to consult with their legal counsel concerning appropriate recordkeeping strategies as a standard part of their O&M programs.

APM 8

Confined Spaces Confined spaces are often encountered in O&M work. Probably the most common areas encountered are crawlspaces, utility and pipe tunnels, manholes and chases. Special precautions are necessary for working in confined spaces. A confined space program, including an entry permit system, must be developed for use when confined spaces must be entered. The APM or another staff person should be able to identify and assess hazards associated with confined spaces. Procedures should be developed to address potential confined space hazards. NIOSH publication number 87-113 (July 1987), entitled "Guide to Safety in Confined Spaces", includes a checklist for safe entry into confined spaces, as well as general information on confined space issues.

Confined space hazards include, but are not limited to:

- Low oxygen content
- Toxic atmospheres (gases, vapors and dusts)
- Hazardous chemicals
- Explosive atmospheres
- Heat stress
- Fire
- Retention of dust and smoke
- Insufficient lighting

- Flooding
- Electrical shock hazards
- Noise

Program elements should include:

- Entry and exit procedures
- Standby/emergency rescue procedures
- Head protection (from bumps, scrapes, cuts, abrasions)
- Worker communication procedures
- Entry permit system
- Atmosphere monitoring
- Ventilation
- Isolation
- Respiratory protection

Depending upon the hazards present, monitoring and special precautions might be needed during the work to maintain a safe work area. As of September 1992, OSHA had developed draft regulations (29 CFR 1910.146) concerning work in confined spaces. The preamble to the proposed rules discussed the types of hazards that will be covered by these regulations. The user of this manual might wish to obtain and review a copy of these proposed rules if confined spaces will be encountered in O&M work.

Appendix "G" includes general information on safety considerations that should be reviewed if work will take place in confined spaces.

APM 9 **Selection of Materials** The APM should be responsible for the selection of certain materials used for O&M activities. This O&M Program will not attempt to give guidance on the selection of all materials needed for O&M work. Information on selection of the following materials is provided:

- Polyethylene
- Lockdown encapsulants

Guidance on the selection of other materials should be obtained in training courses, or from reference materials, such as the NIBS Guide Specifications for Asbestos Abatement.

Polyethylene Various thicknesses, colors and types of polyethylene are available. The most common thicknesses used for asbestos related work are 4 mil and 6 mil. State of [name of state] or local regulations may require that certain thicknesses, number of layers or types of polyethylene be used.

If applicable, include here any specific regulation information; or refer to an Appendix.

Two mil polyethylene is also available, but is not widely used since it tears easily. Polyethylene is also available in fire retardant and anti-static types. Fire retardant polyethylene does not support flame as readily as standard polyethylene. However, some tests have shown only minimal differences in flame spread time between standard and fire retardant poly. Anti-static polyethylene should be used around equipment sensitive to static electricity.

Lockdown Encapsulants Lockdown encapsulants selected should be appropriate for the intended use. Use high temperature rated encapsulants for heating system components such as piping, boilers & flues. Lockdowns should also be compatible with any replacement materials, such as new flooring adhesive. Compatibility should be verified prior to the start of work.

Lockdowns are available in clear or colored mixtures. Clear mixtures should be used where a colored encapsulant would be objectionable for appearance reasons. Colored encapsulants should be used (where possible) with a color chosen to indicate that an area has been locked down. The color also allows a worker to see where encapsulant has been applied during the application.

APM 10 **Emergency Work and Dry Removal** O&M activities sometimes require that regulated asbestos O&M work be performed immediately to maintain operations and prevent other health or safety hazards. Emergency work is acknowledged in regulations and is permitted under certain conditions. The NESHAP regulations specify that a notification for ordered emergency renovation operations must be postmarked or delivered "as early as possible before, but not later than, the following working day" (see regulation for full text). State of [name of state] or local regulations may have additional requirements.

If applicable, include here any specific regulation information; or refer to an Appendix.

Emergency work might involve activities (such as work around activated electrical equipment) where the use of wetting would result in equipment damage or a safety hazard. NESHAP permits work without wetting regulated ACBM under certain conditions (see regulation for details). For

facilities where dry removal work might be required, the APM should review regulatory requirements in advance with authorities having jurisdiction over the facility.

APM 11 **Inspecting Buildings for Asbestos-Containing Building Materials** No O&M Plan can be implemented until the presence of ACBM have been confirmed through a visual inspection of the facility including the collection and analysis of bulk samples. In all likelihood, an inspection and survey have already been performed at facilities occupied or controlled by EPA. GSA procedures require that such an inspection, including collection and analysis of suspect ACBM, be performed before occupancy by federal agencies, including EPA.

Conducting an inspection and survey to identify and locate ACBM is normally performed by the building owner, but a times may be assigned to a tenant (i.e. GSA, EPA or other federal agency) or operator of the facility. At other times, a tenant or operator may collect samples of suspect material(s) not previously sampled in the facility-wide inspection.

Asbestos School Hazard Abatement Reauthorization Act (ASHARA) regulations require that anyone collecting samples for purposes of determining the presence of asbestos must be an AHERA certified Asbestos Inspector.

Appendix J generally discusses conducting an inspection and survey per AHERA regulations, and other EPA guidance documents. AHERA inspection procedures are, by regulation, required only for schools. ASHARA requires certification and training only, not adoption of the sampling and inspection procedures.

Form and format of inspections and surveys vary greatly. All properly conducted inspection will have located and sampled all suspect surfacing, TSI and miscellaneous materials. The facility's full inspection and survey report should be made a part of the facility's O&M Plan to clearly identify ACBM locations. The inspection report should also describe the condition of all asbestos materials so selection of the proper response action and O&M procedures can be implemented.

Any O&M Plan is based upon the facility's inspection and survey report. If one has not been conducted, or it is determined that current inspection maybe inadequate, conducting a proper inspection for ACBM is strongly encouraged.

III

Section III Worker General Procedures

This section includes detailed procedures for steps that are common to many of the work practices. These general procedures are referenced in the work practices and in worker and APM checklists. The general procedures should be reviewed in detail by all personnel using this work practices manual. If possible, the general procedures should be covered in O&M training related to the use of this manual.

The work practices and checklists refer the user to applicable general procedures for detailed information on how to perform a certain portion of the work. Once a user is familiar with the general procedure requirements, it might not be necessary to review the general procedures each time an O&M activity is performed. However, the general procedures should be reviewed periodically by all workers and the APM to verify that the proper procedures are being followed.

Workers should report any suggestions or problems regarding these work practices to their supervisor, the APM or the APM's designee.

Users of the O&M Work Practices Manual should also review the General Safety Considerations information in Appendix "G" of this Manual.

Delete levels and work practices that have been deemed not applicable to this facility.

Examples:

Level 3 Checklist ..... NOT APPLICABLE
W11 Applying Lockdown Encapsulant ..... NOT APPLICABLE

Include or reference state and local regulations affecting these procedures, if applicable.

Also edit page numbering to reflect additions and subtractions of information. DO NOT renumber any procedures or practices.

Level 1 Checklist 3
Level 2 Checklist 4
Level 3 Checklist 6
W1 Tools, Equipment and Materials 8
W2 Preparing Amended Water or Removal Encapsulant 9
W3 Shut-off and Lockout of HVAC and Electrical Systems 9
W4 Securing Work Area 9
W5 Putting on Respirators and Performing Fit Checks 10
W6 Putting on Protective Clothing 11

W7 Beginning and Conducting Air Monitoring 12
W8 Precleaning Work Areas and Wet Wiping 13
W9 Setting up Work Areas 14
W10 Packaging and Labeling Waste 17
W11 Applying Lockdown Encapsulant 19
W12 Cleaning Tools, Equipment and Work Area 19
W13 Decontaminating Waste 20
W14 Worker Decontamination and Removal of Protective Clothing and Respirators 20
W15 Visual Inspection and Completing Air Monitoring 22
W16 Waste Transportation, Storage and Disposal 23
W17 Glovebag Removal 23
W18 Disposal of Contaminated Water 27

***Note:** Not all of the worker general procedures are used in every work practice.*

Figure 4: Level 1 Worker Checklist Operations and Maintenance Work Practices

Pre-Work Activities

- ☐ Obtain and review copies from Supervisor or Asbestos Program Manager of:
  - ☐ Completed Maintenance Work Authorization Form
  - ☐ Work practice(s) to be used including personal protective equipment options
  - ☐ Work Notification(s) (as applicable)
  - ☐ Schedule for work
- ☐ Review work practices and General Procedures W1, W5, W10, W12, W14, W15 and any other general procedures used in work practice.
- ☐ Inspect work area for visible dust or debris. If present, stop work and notify APM.
- ☐ Obtain recommended tools, equipment and materials as described in General Procedure W1, work practice(s) item 2, and Maintenance Work Authorization Form.
- ☐ Move tools, equipment and materials to work area.
- ☐ Shut off and lock out any HVAC or electrical systems to be worked on.
- ☐ If required, on Maintenance Work Authorization Form, put on respirators and perform fit checks - See General Procedure W5.

Work Practices

- ☐ Perform work per steps in work practice(s).

Clean-Up and Tear-Down

- ☐ Remove lockout tags (if used) & restart any HVAC/electrical system(s) that were shut off.
- ☐ Return tools, equipment and remaining materials to storage area.
- ☐ Notify Asbestos Program Manager or supervisor that work is completed & return documents to APM.

Figure 5: Level 2 Worker Checklist Operations and Maintenance Work Practices

Pre-Work Activities

- ☐ Obtain and review copies from Supervisor or Asbestos Program Manager of:
  - ☐ Completed Maintenance Work Authorization Form
  - ☐ Work practice(s) to be used including personal protective equipment options
  - ☐ Work Notification(s) (as applicable)
  - ☐ Schedule for work
- ☐ Review work practices and referenced general procedures used in work practice(s).
- ☐ Obtain recommended tools, equipment and materials - See General Procedure W1 and work practice(s) item 2.
- ☐ Obtain required respirators as listed on Maintenance Work Authorization Form.
- ☐ Move tools, equipment and materials to work area.
- ☐ Shut off and lock out HVAC and electrical systems serving work area - See General Procedure W3.
- ☐ Vacate and secure work area, such as by locking doors and/or setting up temporary barriers - See General Procedure W4.
- ☐ Put on respirators and perform fit checks - See General Procedure W5.
- ☐ Put on protective clothing - See General Procedure W6.
- ☐ Air monitoring personnel begins air monitoring work (if required) - See General Procedure W7.
- ☐ Preclean work area if visible dust or debris is present - See General Procedure W8.

Work Area

- ☐ Set up work area as required by work practice item 3 - See General Procedure W9.

Work Practices

- ☐ Perform work per steps in work practice(s).

Clean-Up and Tear-Down

- ☐ Package and label asbestos waste for disposal - See General Procedure W10.
- ☐ Apply lockdown encapsulant, where required, using garden sprayer, to surfaces where ACBM were removed or disturbed - See General Procedure W11.
- ☐ Perform ceiling panel replacement work or ceiling repair work if needed.
- ☐ Clean tools, equipment and work area using wet wiping and HEPA vacuuming as appropriate and return tools and equipment to outside work area - See General Procedure W12.
- ☐ Decontaminate packaged waste & move waste to outside work area - See General Procedure W13.
- ☐ Workers decontaminate and remove protective clothing and respirators. If contaminated, dispose of protective clothing as ACBM - See General Procedure W14.
- ☐ Complete visual inspection. Complete air monitoring work - See General Procedure W15.
- ☐ If feasible, get APM or designee to complete Evaluation of Work Form.
- ☐ Transport waste to designated asbestos waste storage area - See General Procedure W16.
- ☐ Remove drop cloth.
- ☐ Return decontaminated tools, equipment and remaining materials to storage area.

- ☐ Remove lockout tags and restart HVAC/electrical system(s).
- ☐ Restore normal accessibility to work area.
- ☐ Notify Asbestos Program Manager or Supervisor that work is completed & return documents to APM.

Figure 6: Level 3 Worker Checklist Operations and Maintenance Work Practices

Pre-Work Activities

- ☐ Obtain and review copies from Supervisor or Asbestos Program Manager of:
  - ☐ Completed Maintenance Work Authorization Form
  - ☐ Work practice(s) to be used including personal protective equipment options
  - ☐ Work Notification(s) (as applicable)
  - ☐ Schedule for work
- ☐ Review work practices and referenced general procedures used in work practice(s).
- ☐ Obtain recommended tools, equipment and materials - See General Procedure W1 and work practice(s) item 2.
- ☐ Obtain required respirators as listed on Maintenance Work Authorization Form.
- ☐ Move tools, equipment and materials to work area.
- ☐ Shut off and lock out HVAC and electrical systems serving work area - See General Procedure W3.
- ☐ Vacate and secure work area, such as by locking doors and/or setting up temporary barriers -See General Procedure W4.
- ☐ Put on respirators and perform fit checks - See General Procedure W5.
- ☐ Put on protective clothing - See General Procedure W6.
- ☐ Air monitoring personnel begins air monitoring work (if required) - See General Procedure W7.
- ☐ Preclean work area if visible dust or debris is present - See General Procedure W8.

Work Area

- ☐ Set up work area and decontamination facilities as required by work practice item 3 - See General Procedure W9.

Work Practices

- ☐ Perform work per steps in work practice(s).

Clean-Up and Tear-Down

- ☐ Package and label asbestos waste for disposal - See General Procedure W10.
- ☐ Apply lockdown encapsulant, where required, using garden sprayer, to surfaces where ACBM were removed or disturbed - See General Procedure W11.
- ☐ Perform ceiling panel replacement work or ceiling repair work if needed.
- ☐ Clean tools, equipment and work area using wet wiping and HEPA vacuuming as appropriate and return tools and equipment to outside work area - See General Procedure W12.
- ☐ Decontaminate packaged waste & move waste to outside work area - See General Procedure W13.
- ☐ Workers decontaminate and remove protective clothing and respirators. If contaminated, dispose of protective clothing as ACBM - See General Procedure W14.
- ☐ Complete visual inspection. Complete air monitoring work - See General Procedure W15.
- ☐ If feasible, get APM or designee to complete Evaluation of Work Form.
- ☐ Transport waste to designated asbestos waste storage area - See General Procedure W16.
- ☐ Remove drop cloth and/or mini-enclosure.
- ☐ Return decontaminated tools, equipment and remaining materials to storage area.

- ☐ Remove lockout tags and restart HVAC/electrical system(s).
- ☐ Restore normal accessibility to work area.
- ☐ Notify Asbestos Program Manager or Supervisor that work is completed & return documents to APM.

W-1 **Tools, Equipment and Materials** The following is a list of tools, equipment and materials that are referenced in the work practices and are recommended to perform the work practices. Tools, equipment or materials that are unique to a certain work practice are listed under item 2 in each work practice. For frequent O&M work, it might be helpful to maintain an "O&M cart" containing the necessary tools, equipment and materials.

Tools and Equipment

- Utility knife
- Ground fault circuit interrupters (GFCI's), Extension cords and adapters - GFCI's should be used on any electrical equipment or tools used in O&M work where water might be in use or present in the work area.
- Lockout tags
- Temporary work lights
- Ladder or scaffold for elevated work
- Wet wipes or bucket with clean water for wet wiping
- Smoke test bulb and tubes
- Bone saw
- Wire cutters
- Tin snips
- Safety glasses

Abatement Equipment and Materials

- Polyethylene sheet
- Duct tape
- Disposal bags with labels
- High efficiency particulate air (HEPA) vacuum with hose, attachments and proper HEPA filter (wet/dry type needed for some work practices)
- Respirators (if required)
- Disposable coveralls (if required)
- Disposable towels or wet wipes
- Asbestos barrier tape
- Warning signs
- Garden sprayer with amended water or removal encapsulant (Level 2 and 3 practices) See general procedure W2.
- Aerosol cans or garden sprayer with lockdown encapsulant (Level 2 and 3 practices)
- Air monitoring pumps, cassettes and calibration equipment (if required)
- Frame for mini-enclosure or prefabricated mini-enclosure (Level 3 practices)

- Negative pressure machine (HEPA filtered exhaust fan) as required for size of enclosure (level 3 practices - could be negative pressure machine or additional HEPA vacuum)
- Manometer (if pressure differential measurements are desired)
- Glovebags (if required)

W-2 **Preparing Amended Water or Removal Encapsulant** Amended water or removal encapsulant solutions are prepared by mixing a measured amount of surfactant or encapsulant with clean water in accordance with the manufacturer's instructions. Surfactants and encapsulants materials might be considered hazardous substances. Containers of amended water or removal encapsulant should be labeled to identify the contents in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200). Review and comply with Material Safety Data Sheet (MSDS) before mixing and using these materials. Amended water or removal encapsulant should be mixed in a labeled garden sprayer unit prior to the start of an O&M activity.

Some practitioners have reported that liquid dishwashing detergent might be used as a surfactant for O&M work. They have used a mix of 8 parts water to one part detergent.

W-3 **Shut-off and Lockout of HVAC and Electrical Systems** Any electrical systems that might be worked on or affected by O&M activities should be shut off, locked and tagged with electrical lockout tags at the circuit breaker panel or disconnect switch. Affected systems include systems that could create electrical hazards during O&M activities that involve wetting.

HVAC systems in a work area, systems that serve a work area, or systems that will be worked on should be shut down during O&M activities. Level 1 activities usually do not require HVAC shut down unless a work will occur on a system or a disturbance of asbestos will occur. Any air-handling systems (supply, return and exhaust) required to be shut down should be shut off, locked, and tagged with electrical lockout tags at the circuit breaker panel or disconnect switch.

Lockout tags should note when and why power is shut down and the personnel performing the lockout. There should only be one key for each lock used on lockout tags to prevent accidental reactivation of equipment.

W-4 **Securing Work Area** When asbestos fibers might be released, work areas should be vacated and secured (where feasible) by scheduling, locking doors (from inside the area if possible) or other means. Installing polyethylene critical barriers over all openings into the work area. If this is not feasible, access to the work area should be restricted, such as by

asbestos barrier tape around the perimeter of the work area. If barrier tape is used to denote a work area, it should be placed 5 to 10 feet (1.5 to 3 meters) outside of any polyethylene protection used in the work area. Install barrier tape by taping or tying it to fixed objects.

Do not block access to any emergency exits, and when asbestos fibers might be released, post OSHA required "danger" signs at all entrances to the work area. For such projects, it might be desirable to have a visual barrier installed several feet in front of warning signs to avoid having warning signs readily visible to occupants. A "keep out of construction area" sign should be posted on visual barriers. A visual barrier would be arranged so that a person who goes past the visual barrier will then see required warning signs.

W-5 **Putting on Respirators and Performing Fit Checks** The procedures described below are based on the assumption that workers wearing respirators have been trained in the use of respirators and, for negative pressure respirators, fit tested, and enrolled in a medical surveillance program as part of a Respiratory Protection Program. Respirators used should be approved by NIOSH and/or MSHA. These procedures are not a substitute for a Respiratory Protection Program in accordance with OSHA standard 29 CFR 1910.134 or regulatory requirements regarding respirators.

Putting on Respirator Wearers should inspect their respirators before each use of the respirator. Respirators must not be damaged, have missing parts or be deformed in any way. The straps must be intact and well attached. Proper filter cartridges for the hazards to be encountered must be installed. Verify that filters have been replaced in accordance with the Respiratory Protection Program. Batteries for powered respirators should be fully charged. The respirator should also be cleaned if it was not cleaned after the last use. If any problems exist, the respirator should be repaired or replaced in accordance with the Respiratory Protection Program.

When putting on a respirator, the straps should be loosened before it is put on. Filter caps (such as those used on some Powered Air Purifying Respirators) should be taped to the filter body or stored where it will not be lost. Powered respirators should be turned on and flow checked before the facepiece is put on. The respirator should be put on and then the straps tightened as recommended in the manufacturer's information provided with the respirator. Fit checks should then be performed.

Fit Checks Fit checks should be performed in accordance with the Respiratory Protection Program by each worker each time they put on a respirator. Both positive and negative pressure fit checks should be performed. When feasible, powered respirators should be checked with the motor unit turned off. A negative pressure fit check is done by donning the

respirator and pulling the respirator straps so the unit fits snugly. Inhale gently while placing hands over filters to block off inhalation side. Respirator should pull to face and no air should leak in around face seal.

A positive pressure fit check is done by exhaling gently (without breaking respirator seal to face) breathing normally while blocking off the exhalation valve. The face piece should then expand away from face while exhaling.

Adjust respirator straps as needed to obtain a good seal of the facepiece to the face. If a good seal cannot be obtained, obtain a new respirator and perform fit tests again.

W-6 **Putting on Protective Clothing** Protective clothing for workers typically consists of disposable coveralls, gloves and boots. Coveralls should have hoods and booties attached. They should provide complete coverage of the body with the exception of hands and face. Cloth coveralls that are cleaned by a facility equipped to launder asbestos contaminated clothing might also be used. Do not modify coveralls.

Protective Clothing Options Available for O&M Work Include If potential for exposure to asbestos-containing dust and debris is low and localized, use:

1. One disposable coverall with no street clothes, or
2. One disposable coverall over street clothes.

If potential for exposure to asbestos-containing dust and debris is moderate or dispersed, use:

1. Two disposable coveralls with no street clothes, or
2. Two disposable coveralls over street clothes.

If street clothes could become contaminated, two coveralls should be worn, or the street clothes should be removed before the start of work.

When possible, street clothes should be removed in a changing area before protective clothing is put on. Protective clothing should be put on after respirators. The coverall hood should cover respirator straps.

Workers are encouraged to wear protective gloves that are duct taped at the cuffs to the protective coveralls. Eye, hearing, and head protection should also be used where needed. Rubber slip-resistant boots are recommended for work areas where slip hazards might occur (protective booties should cover feet inside the boots). Steel-toed boots should be used in areas where foot hazards exist. Do not use coveralls with loose foot coverings for activities that involve climbing ladders or working on scaffold.

W-7 Beginning & Conducting Air Monitoring

Note: This section is not intended as a substitute for a complete Air Monitoring Program and specific protocols needed for O&M work. This section notes air monitoring issues that need to be addressed by the air monitoring person.

Air monitoring during O&M activities can consist of personal monitoring, area monitoring and clearance monitoring. Air monitoring required for the work practice being performed should be listed on the Maintenance Work Authorization Form and be conducted in accordance with applicable regulations (such as 29 CFR 1926.58 Appendix A), the O&M Plan and Air Monitoring Program. All air monitoring work should be conducted by a trained air monitoring person assigned by the APM.

The air monitoring person should calibrate, adjust, and record the flow rate of all air monitoring pumps to be used before air monitoring is started for an O&M activity. General procedure W15 covers visual inspections and the completion of air monitoring at the end of the work.

Personal Monitoring To perform personal monitoring, attach a personal air monitoring pump to a belt worn by the worker. Attach an air sampling cassette to the hose from the pump. Route the hose up the worker's back and tape the hose to the worker's protective coveralls using duct tape. The cassette should be located with the open end facing downwards at approximately a forty-five degree angle in the worker's "breathing zone" at about collar level. Turn the pump on and record start time. The air monitoring person will retrieve or change the cassette when necessary, or when work is completed.

Area Monitoring Area monitoring is usually performed using high volume air sampling pumps. Place pumps inside the work area and outside the work area in occupied areas or areas where occupants could be exposed if fibers are released from the work area. Pumps should be located where they obtain meaningful measurements of potential worker exposure during monitoring. Attach sampling cassettes to the hoses from the pumps and attach the cassettes to the top of tripod stands or other stable structures (but not the pumps themselves) to locate the sample at four to five feet (1.2 to 1.5 meters) above the floor. These cassettes should be located with the open end facing downwards at approximately a forty-five degree angle. The air monitoring person will retrieve or change cassettes as needed or when the work is completed.

If any samples analyzed during the work exceed predetermined "stop work levels" specified in the O&M program, productive work shall be stopped, the area cleaned and additional engineering controls implemented, as necessary.

W-8 **Precleaning Work Areas and Wet Wiping** Precleaning of work areas prior to the start of work is done to remove accumulated debris that could be disturbed during the work. Precleaning might include picking up dust and debris with a HEPA vacuum, wet wiping non-porous surfaces, HEPA vacuuming surfaces that cannot be wet wiped, and cleaning any carpeted surfaces using steam extraction equipment. Precleaning might reduce the extent of cleaning required after the work and for clearances (if required).

Wet Wiping The procedures to be used for wet wiping are as follows:

1. Immerse disposable towel in bucket containing amended water.
2. Wring out towel and fold into quarters.
3. Wipe surface and refold to have a clean face exposed. Do not place towel back into bucket or water will become contaminated and will need to be replaced.
4. Repeat step 3 until all faces of towel have been used. Obtain a clean towel if more
   wiping is needed.
5. Dispose of used towels in disposal bags.
6. Dispose of contaminated water as required by applicable regulations -See general procedure W18.

HEPA Vacuuming The procedures to be used for HEPA vacuuming are as follows:

1. For floors, use a floor attachment with rubber floor seals and adjustable floor-to-attachment height. For furniture, fabrics or other surfaces use an upholstery attachment or brush attachment.
2. Vacuum hard or smooth surfaces with attachment about 1/16" (2 mm) above the surface.
3. Vacuum carpet or fabrics with attachment just touching the surface.
4. Vacuum all surfaces in parallel passes with each pass overlapping the previous one by one-half the width of the attachment.
5. Once surfaces are cleaned in one direction, clean a second time at right angles to the first cleaning.
6. Use crevice brush or other tools to clean irregularly shaped surfaces.

Steam Cleaning Carpet The procedures to be used for steam cleaning carpet are as follows:

1. Steam clean carpet using carpet tool.
2. Steam clean all surfaces in parallel passes with each pass overlapping the previous one by one-half the width of the attachment.
3. Once surfaces are cleaned in one direction, clean a second time at right angles to the first cleaning.
4. Water from cleaning process should be treated in accordance with applicable regulations - See W18.

W-9 Setting up Work Areas

Note: Polyethylene work area protection is not to be used in place of other engineering controls and good work practices. Work practices such as wetting ACBM, careful handling, local collection by HEPA vacuum and local exhaust ventilation should be the primary means of fiber control during O&M work. Polyethylene protection, glovebags, and mini-enclosures are intended as a secondary means of protection during the work. State of [name of state] or local codes might require that fire retardant polyethylene be used for asbestos related work.

The NIBS Asbestos Abatement and Management in Buildings: Model Guide Specifications Section 01527 "Regulated Areas" provides information on the preparation of "a regulated area" for small scale, short duration work. Section 01529 "Small-Scale Short-Duration Work" of the NIBS specifications provides information on the set up of a mini-enclosure. Review of this additional information is encouraged.

Preparation of work areas for O&M activities typically involves the use of a polyethylene drop cloth or mini-enclosure. Other techniques, such as the use of a glovebag taped over a self-supporting framework might also be used as a substitute for the specified methods where appropriate. For small amounts of removal work (such as several floor tile or a cutting a hole in asbestos-containing drywall) where an enclosure is desired or needed, a glovebag can often be used in lieu of a full mini-enclosure.

Polyethylene Drop Cloth Preparing a work area with a drop cloth requires that a single layer of polyethylene be spread on the floor of the work area and taped or weighted in place. Do not use more than one layer if ladders (or similar equipment) will be used, unless a hard surface, such as plywood is laid over the drop cloth. If floor is a soft material, such as carpet, use caution to prevent tearing of polyethylene under equipment. The drop cloth should cover an area large enough to catch falling debris. If work is to be performed at an elevated level, the drop cloth should be placed on the work platform, or extended at ground level beyond the immediate work location to catch any debris that might be generated. Note that the use of a drop cloth introduces potential slip hazards in the work area. Non-slip foot coverings are recommended where drop cloths are used.

Mini-Enclosure A mini-enclosure is usually a polyethylene enclosure around a work area. Mini-enclosures are sealed enclosures used as a secondary means to help, or attempt to, contain fibers or debris generated during the work.

Mini-enclosures also serve to provide a visual barrier between the workers and any other personnel around the work area. As noted above, careful work practices should be the primary means of fiber control during the work in order to prevent gross contamination of the mini-enclosure.

It is sometimes appropriate to extend mini-enclosures above ceilings, such as by using polyethylene sheet and framing taped together to provide enclosure around the work area. The mini-enclosure should not contact ACBM covered surfaces. The construction will vary depending on whether the enclosure will be attached to pipes, conduit, metal hangers, or some other form of existing construction.

There are a variety of commercially available types of mini-enclosures, including prefabricated pop-up boxes and adjustable framework assemblies to permit different sizes of enclosures to be constructed. Disposable liners for mini-enclosures (to facilitate set up and dismantling of the enclosure) are available from some manufacturers. It might be beneficial to construct or purchase a portable mini-enclosure unit that works for the typical conditions found in a given facility.

It is recommended that two workers be used to set up and operate mini-enclosures. To construct a mini-enclosure, erect a framework of wood, PVC piping or metal framing that will enclose the work area and be large enough for one person to work inside. The minimum width and depth of the enclosure should be at least 3 feet (1 meter). The height of the enclosure will vary depending upon the work to be performed and the height of the work area. A larger enclosure is preferable where space permits. However, if the enclosure is too large, the final cleaning process will require more time. A mini-enclosure can include a separate 3 foot by 3 foot by 7 foot (1 x 1 x 2.1 meters) change room, with curtain doorways, attached to the mini-enclosure for changing and removing protective clothing.

If an entire room will be enclosed for performing work, the framework is usually not necessary, unless wall surfaces will be damaged by tape used to support polyethylene. A room can be enclosed for O&M work by installing one layer of polyethylene sheet on the walls and floor of the room.

If the work to be performed is in an elevated location, the enclosure (and change room, if used) should be erected on a scaffold platform large enough to support the enclosure, change room (if used), and a step off area outside the enclosure.

Refer to OSHA regulations 29 CFR 1910.28 and 29 CFR 1926.451 concerning scaffold requirements. Any ladders and/or scaffolds used must be built and used in conformance with the OSHA construction standards, and applicable state and local standards. See Appendix G of this manual.

Cover the floor and the framework for the enclosure and change room with one layer of polyethylene attached using duct tape. A second layer of polyethylene laid on the floor might facilitate clean up work, or reduce the possibility of tearing the polyethylene if equipment is used (do not use two layers under the legs of ladders). Construct curtain doorways between the change room and the enclosure and between the change room and the area outside the change room. A curtain doorway is made of three overlapping sheets of polyethylene. Attach sheets to framework at top and one side. The middle sheet should be attached on one side, and the inner and outer sheets attached on the other side. A sheet of polyethylene approximately 5 feet by 5 feet (1.5 meters by 1.5 meters) or larger should be installed outside the change room for use as a step off area and as a place to put decontaminated materials removed from the work area.

Mini-enclosures should be constructed with a ceiling of polyethylene if work will not be performed above the enclosure. If work is to be performed above the enclosure and the ceiling is not ACBM, the enclosure should extend to and be sealed to the ceiling or grid system. If the enclosure is below an ACBM finished surface, use one of the following methods:

1. If ACBM cannot be contacted, the enclosure should be separated from the ceiling by a narrow space.
2. If ACBM will withstand contact without damage and are in good condition, foam tape (1" (25mm) or thicker) can be placed on the top edge of the enclosure. Gently lift enclosure into place until sufficient contact is made to provide a seal to the surface.

After enclosure is in place, check for, and clean up any debris generated by enclosure installation.

Mini-enclosures should be set up with a negative pressure system as described below to reduce the possibility of fibers being released from the enclosure and to filter the air inside the enclosure.

Negative Pressure System and HEPA Filtered Local Exhaust Ventilation:

Note: Certain configurations of negative pressure systems (pressure differential systems) are covered by patents. The APM should review applicable patent information regarding use of these systems. This manual uses the term "negative pressure system" as a synonym for "pressure differential system".

Mini-enclosures should be provided with a negative pressure system to reduce the possibility of fibers being released from the enclosure during the work, and to filter inside air discharged from the enclosure. Negative pressure inside mini-enclosures is commonly provided by a High Efficiency Particulate Air (HEPA) filtered vacuum or by negative pressure machines,

depending upon the size of the enclosure. The NIBS Asbestos Abatement and Management in Buildings: Model Guide Specifications Section 01513 "Temporary Pressure Differential & Air Circulation System" gives guidance on pressure differential systems and suggested rates of air circulation in terms of air changes per hour. A HEPA vacuum will usually provide sufficient negative pressure for a small enclosure. Larger enclosures might require a small negative pressure machine (HEPA filtered fan unit) to achieve a negative pressure inside the enclosure.

A negative pressure system for a mini-enclosure most commonly locates the HEPA vacuum or negative pressure machine outside the enclosure. The intake side of the unit is ducted to the enclosure through the vacuum hose or flexible duct material taped to a hole in the enclosure on the side opposite from the change room or as close as possible to where the work will be performed. The filtered exhaust side of the unit should be ducted to the outside if possible. However, most vacuum units do not provide a connection for an exhaust duct, and are commonly exhausted to the inside. Additional protection might be desirable for an area where air is exhausted inside a building. A work practice is provided for changing filters in HEPA vacuums and negative pressure machines (HEPA filtered exhaust fans) when needed. Filters should not be changed without following these work practices.

When HEPA filtered local exhaust ventilation is used in a work practice, this can be in addition to, or in place of, a negative pressure system. A HEPA filtered local exhaust ventilation system might replace a negative pressure system if the ventilation system provides adequate negative pressure in the work area. Some work practices use HEPA filtered local exhaust ventilation for fiber control where an enclosure is not used. A HEPA ventilation system can use a HEPA vacuum or negative pressure machine. The hose attached to the HEPA unit should be kept as close as possible to the location where ACBM might be, or is, disturbed.

W-10 **Packaging and Labeling Waste** Asbestos-containing waste material from O&M activities should be adequately wet in accordance with the NESHAP requirements (40 CFR 61.150). Verify waste packaging and other waste disposal requirements with the landfill that will receive the asbestos waste. Pre-labeled asbestos disposal bags should be used for asbestos waste disposal where possible, appropriate and permissible. Disposal bags should be collapsed by evacuating the air from the bag with a HEPA vacuum in the work area or enclosure. Once collapsed, twist the bag to form a neck and wrap it tight with duct tape. Fold neck of bag over to form a loop, then again wrap duct tape around neck and loop.

Although not a federal regulatory requirement, asbestos waste is often placed into second disposal bag and sealed as described above. Label disposal bags as required by applicable NESHAP, OSHA and DOT regulations.

Asbestos waste that does not fit into disposal bags should be wrapped leak-tight in one or two layers of 6 mil (0.15 mm) polyethylene sheet. Each layer should be sealed tightly with duct tape. Label outer layer as required by regulations.

Sharp objects that might puncture polyethylene (such as floor tile) should be placed into cardboard boxes before wrapping in one or two layers of 6 mil (0.15 mm) polyethylene.

All waste should be labeled as required by federal, state and local regulations. Federal regulations requiring labeling of waste include OSHA regulations 29 CFR 1910.1200, 1910.1001 and 1926.58, EPA's NESHAP regulation 40 CFR 61.150, and the Department of Transportation's Hazardous Materials Regulations 49 CFR 171 and 180. ACBM packaging, with some exceptions, must meet general DOT and EPA requirements and be protective, marked and labeled. See Appendix I for further information. Review current labeling requirements with APM and disposal site. The OSHA requirements apply regardless of the amount of waste or measured exposure levels (see 29 CFR 1926.58(l).

Labels Requirements Include:

OSHA 29 CFR 1926.58(k)(2) requirement:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

Department of Transportation (DOT) requirement DOT's shipping paper and marking format, used with some exceptions (see Appendix I) is:

RQ, (Reportable Quantity, if over 1 lb (.4 kg) friable asbestos)
WASTE (For transportation of waste material, if applicable)
WHITE ASBESTOS (or BLUE or BROWN)
(Shipping name; asbestos descriptions; see below)

MIXTURE (For asbestos mixed with a binder or filler, etc.)
9, (Class 9, Miscellaneous Hazardous Materials, includes asbestos)
UN2590 (or UN2212, or UN2212), (United Nations Identification numbers for the 3 DOT asbestos descriptions)

PG III (or II or II), (Packaging Groups for the 3 DOT asbestos descriptions; II and III are medium and minor; use II if mixed shipment)

LTD QTY, (Limited quantity, if applicable)
20 OZ (.6 kg) (Total quantity of material described; may abbreviate unit)
DOT defines chrysotile, actinolite, anthophyllite and tremolite asbestos as "white asbestos," crocidolite asbestos as "blue asbestos," and amosite and mysorite asbestos as "brown asbestos."

NESHAP requirement NESHAP requires that readily visible and legible warning labels as specified by OSHA under 29 CFR 1910.1001(j)(2) or 1926.58 (k)(2)(iii) be used on waste containers or wrapped materials (this is the same as the OSHA 29 CFR 1926.58 label listed above). Waste material to be transported off the facility site must also be labeled with the name of the waste generator and the location at which the waste was generated.

W-11 **Applying Lockdown Encapsulant** A lockdown encapsulant should be applied to areas where ACBM are removed. Lockdown encapsulants used should be tested per 1978 Battelle/EPA report "Tests for the Evaluation of Encapsulants for Friable Asbestos-Containing Materials". Encapsulants should be water resistant after curing and be Class "A" fire rated per ASTM 84-81A "Standard Method for Surface Burning Characteristics of Building Materials.

Lockdowns need to be compatible with any materials that will be installed over the encapsulant. Note that many lockdown encapsulants will act as an adhesive and could be objectionable on some surfaces when dry. Care should be taken to avoid getting encapsulant on or in HVAC units, HEPA vacuums, and negative pressure machines.

Lockdown is typically applied for O&M work using a garden sprayer. It should be applied in accordance with the manufacturers' recommendations in two light coats sprayed from opposite directions to seal all portions of surfaces including any exposed edges of remaining ACBM.

W-12 **Cleaning Tools, Equipment, and Work Area** Clean tools and equipment using HEPA vacuuming and/or wet wiping procedures. Special attention should be given to cleaning extension cords, equipment wheels, vacuum hoses and other items that could pick up debris during the work. Tools and equipment should be placed outside of the work area as soon as cleaning is completed. Drop cloths and mini-enclosures can be cleaned or disposed of as ACBM. Any items that cannot be fully cleaned (such as boots or tools) that might be used in another O&M activity should be placed into disposal bags, sealed and labeled as ACBM. These bags

should be wet wiped and then placed outside of the work area with the other tools and equipment. Do not open bags containing contaminated tools, or open equipment such as a HEPA vacuum, except during another O&M activity or in a designated work area. HEPA vacuum hoses can be sealed with tape over both ends if the outside of the hose is clean.

Cleaning of the work area where an O&M activity is conducted consists of HEPA vacuuming and/or wet wiping (as appropriate) all surfaces in the area. HEPA vacuuming and wet wiping shall be performed as described in general procedure W8 above.

W-13 **Decontaminating Waste** Packaged waste should be HEPA vacuumed and wet wiped before it is moved out of the work area. Use the wet wiping and HEPA vacuuming procedures in general procedure W8. Packaged waste should be placed on a sheet of polyethylene when it is moved outside of the work area. This polyethylene can be the outer portion of a drop cloth, if a drop cloth is being used.

W-14 **Worker Decontamination and Removal of Protective Clothing and Respirators**

Removal of Protective Clothing (if used) Decontamination and removal of protective clothing following O&M activities should use the applicable procedure(s) described below:

Removal of Protective Clothing When Drop Cloth Work Area Protection, or no Work Area Protection, is Used HEPA vacuum all parts of protective clothing while standing at perimeter of drop cloth. Leaving respirator in place, remove protective clothing and fold inside out as it is removed. Place clothing, if contaminated, into a disposal bag and label as ACBM waste.

Removal of Protective Clothing If A Mini-Enclosure and Change Room is Provided HEPA vacuum all parts of protective clothing while inside work area enclosure.

If two disposable coveralls are used, remove outer coveralls in work area while leaving respirator in place. Fold coveralls inside out as they are removed. Move to change room, HEPA vacuum protective clothing, and remove second set of coveralls in the same manner.

If only one set of disposable coveralls is worn, remove in change room while leaving respirator in place. Fold coveralls inside out as they are removed.

Place protective clothing, if contaminated, into a disposal bag and label as ACBM waste. Wash hands, face and surface of respirator with clean water and disposable towels. Use caution to avoid breaking seal between respirator facepiece and face. Place disposable towels into a disposal bag. Remove respirator and follow procedures specified in Respiratory Protection Program for cleaning and storing respirator. Change respirator filters if needed or required and dispose of used filters as ACBM. Put street clothes on and exit change room.

Removal of Protective Clothing if a Shower is Available If a shower with waste water filtering for ACBM are available, follow the applicable clothing removal procedure described above. Remove protective clothing in work area and put on a clean set of protective coveralls. Proceed to shower with respirator still in place. At shower facility, remove protective coveralls, folding inside out during removal. Place clothing, if contaminated, into a disposal bag and label as ACBM waste. Shower completely, and remove and clean respirator while showering as described below.

Street Clothes If street clothes are worn under protective clothing and are contaminated during the work, the street clothes should be HEPA vacuumed, removed during decontamination and placed into a labeled disposal bag. These street clothes should then be disposed of as ACBM or taken to a facility that has equipment designed for cleaning asbestos-contaminated clothing.

Removal of Respirator (if used) The procedures described below are based on the assumption that workers wearing respirators have been trained in the use of respirators and, for negative pressure respirators, fit tested, and enrolled in a medical surveillance program as part of a Respiratory Protection Program.

Remove respirator after removing protective clothing (if used). Before removing respirator, wash hands, face and surface of respirator with clean water and disposable towels. Use caution to avoid breaking seal between respirator facepiece and face. Avoid getting water into filter cartridges of respirator. Place disposable towels into a disposal bag. Remove respirator and follow procedures specified in Respiratory Protection Program for cleaning and storing respirator.

W-15 Visual Inspection and Completing Air Monitoring

Visual Inspection The APM should develop building-specific protocols for visual inspections following O&M work. A visual inspection should be conducted prior to the completion of air sampling to verify that all visible dust or debris has been cleaned up. The person performing the inspection can be a worker. If the APM or another person makes this inspection, they should wear the same type of personal protective equipment worn by the workers. If visible dust or debris remains, it must be cleaned up using wet wiping and/or HEPA vacuuming before clearance sampling is started. The EPA's Purple Book and the American Society for Testing and Materials (ASTM) "Standard Practice for Visual Inspection of Asbestos Abatement Projects" (Document E1368-90) provide visual inspection procedures that might be helpful in developing O&M inspection procedures.

Because the ASTM (Document E 1368-90) is copyrighted material, it cannot be full included and reprodcued as a part of this O&M document. Copies may be obtained by contacting ASTM at the following address:

ASTM
1916 Race Street
Philadelphia, Pennsylvania 19103-1187
Telephone: 215/299-5585
Telefax: 251/977-9679

Air Samples Complete air monitoring work in accordance with Air Monitoring Program and requirements noted on a Work Authorization Form. Verify that removal areas have been encapsulated ("locked down"), that the work area, tools, and equipment have been cleaned, and that the area has passed a visual inspection. When air sampling cassettes are retrieved, the air monitoring person should record the stop time for the samples and check and record the flow rate of the air monitoring pumps. Samples should be analyzed on-site (for PCM analysis) if possible, or sent to a laboratory for analysis. When sample results are received, compare results to Air Monitoring Program criteria for work release or clearance. If sample results exceed criteria, the work area should be recleaned, reinspected, and then additional air samples should be obtained. If samples are equal to or below release criteria, tear down work can proceed. Collect air sampling pumps and equipment from work area and other locations when air sampling work is completed.

W-16 **Waste Transportation, Storage and Disposal** Transport asbestos waste from O&M activities to a designated storage area or an approved landfill after the work is completed. Workers transporting waste should follow Respiratory Protection Program recommendations concerning respirator requirements for transporting asbestos waste. Do not drag packaged waste. All waste should be lifted and carried, or transported in wheeled carts, when moved from one area to another. Packaged waste should be placed, not thrown or dropped, into vehicles, storage areas and the landfill.

Any asbestos waste that is not taken to a landfill should be stored in a secure, lockable area. Signage in accordance with NESHAP should be posted at the storage area and on vehicles used to transport asbestos-containing waste material during loading and unloading. When asbestos waste in the storage area is taken to a landfill, it should be transported in accordance with all applicable federal, state and local regulations. Asbestos waste shipment records should be completed in accordance with the requirements in NESHSAP Section 61.150.

The workers conducting the O&M activity should fill out part 1 of the waste tracking form included in Appendix D or an equivalent form. Once part 1 is completed and the waste is stored or taken to a landfill, the form should be turned over to the APM to complete part 2 and file with O&M records. NESHAP waste shipment records must also be completed (where applicable) and filed with waste disposal records.

W-17 **Glovebag Removal** (Also includes other types of prefabricated removal enclosures) Remove asbestos-containing material inside a glove bag according to the following procedures. Glovebags should be used only once and should not be moved to another location to perform additional removal work, or reused in any way. Glovebags are available in many different sizes, shapes and configurations to accommodate the variety of removal situations that might be encountered. Glovebags are available for use in horizontal, vertical or other special applications. Since standard glovebags will melt if used on surfaces over 120-150 degrees Fahrenheit (50-65 degrees Celsius), special types of glovebags are available for use on high temperature piping or other surfaces.

Other types of prefabricated removal enclosures include "glovebox" type enclosures, multiple glovebag assemblies, glovebags with self-supporting frames, and glovebags that funnel waste into standard disposal bags. Check with equipment suppliers for information on these enclosures.

As discussed in W9, glovebags might be used with a framework for O&M work on flat areas such as surfacing materials. Note that significant asbestos exposures to workers can result from the improper use of

glovebags. Workers should obtain information on current regulatory requirements on glovebag use from the APM.

Procedure A. Glovebag Removal Procedures Check area where the work will be performed. If damaged ACBM are present (broken lagging, hanging, etc.), wrap in polyethylene and cover polyethylene with strips of duct tape for reinforcement. Place one layer of duct tape around the removal area where the glove bag will be attached. Also protect any damaged ACBM outside the glovebag area that could be disturbed during the work.

Slit top of the glove bag open (if necessary) and cut down the sides to accommodate the removal area.

Place necessary tools into pouch located inside glove bag (or into a sleeve turned inside out). Tools needed typically include: scraper, bone saw, utility knife, disposable towels, nylon brush, abrasive pads, wire cutters, tin snips and pre-wetted lag cloth. Cut lag cloth to sizes needed to cover any ACBM that will remain after glovebag work is completed.

Place one strip of duct tape along the edge of the open top slit of glove bag for reinforcement.

Place the glove bag around area to be worked on and staple top together through reinforcing duct tape. Provide 8-12" (200-300 mm) of space inside glovebag between removal surface and glovebag for working room. Secure glovebag to duct tape previously installed around removal area.

Use smoke tube and aspirator bulb to test seal. Place tube into water sleeve (two-inch [50 mm] opening to glove bag) squeezing bulb and filling bag with visible smoke. Remove smoke tube and twist water sleeve closed. While holding the water sleeve tightly, gently squeeze glove bag and look for smoke leaking out, (especially at the top and ends of the glove bag). If leaks are found, tape closed using duct tape and re-test.

If a negative pressure glovebag with a supporting framework and HEPA filtered makeup air port is being used, attach hose from an operating HEPA vacuum to glovebag to provide negative pressure in glovebag. Follow equipment manufacturer's instructions on use of negative pressure equipment.

Insert wand from garden sprayer with amended water through water sleeve. Duct tape water sleeve tightly around the wand to prevent leakage.

Insert arms into glovebag sleeves.

Remove any metal jacketing or covering over the area where removal is required using tin snips and/or wire cutters. Fold in any sharp edges to avoid cutting the bag. Pierce any painted coverings to permit water to soak into the ACBM.

Adequately wet material to be worked on with amended water and allow to soak in. Wet adequately to penetrate and soak material through to substrate.

Cut insulation section to be removed using bone saw or utility knife. Use caution to avoid cutting glovebag. Lift glovebag away from cutting area if necessary. Throughout this process, spray amended water or removal encapsulant on the cutting area to keep dust to a minimum.

Remove insulation using scraper or other tools. Place pieces in bottom of bag without dropping. Rinse all tools with amended water inside the bag and place back into pouch or a sleeve of the glovebag turned inside out.

Using nylon brush, scrub pads, disposable towels and amended water, scrub and wipe down the removal area.

Seal exposed ACBM around removal area using pre-wetted lag cloth or encapsulate with a bridging encapsulant. Encapsulate removal area with an appropriate lockdown encapsulant. Use suitable high temperature encapsulants for hot piping.

Wash down inside of glovebag with amended water and wipe as necessary to move all debris and residue to lower part of glovebag (below where bag will be twisted and cut).

Remove water wand from water sleeve, twist water sleeve closed and seal with duct tape.

From outside the bag, pull the tool pouch or sleeve away from the bag and twist pouch to seal it from rest of bag. Place duct tape over twisted portion and then cut the tool bag from the glove bag, cutting through the twisted/taped section.

Contaminated tools might then be placed directly into another glove bag without cleaning. Alternatively, tool pouch with the tools can be placed in a bucket of water,opened underwater, and tools cleaned and dried. Discard disposable towels and nylon brush with asbestos waste. Dispose of contaminated water as set forth in general procedure W18 below.

Evacuate air from glovebag using HEPA vacuum. With HEPA vacuum operating and removed insulation in the bottom of the bag, twist the bag several times and tape it to keep the material in the bottom during removal of the glove bag from the removal area.

Slip a 6 mil (0.15 mm) disposal bag over the glove bag (still attached to removal area). With the hose of an operating HEPA vacuum inserted in the upper part of glovebag, remove tape or cut bag and open the top of the glove bag and fold it down into disposal bag.

Procedure B. Use of a Glovebag with Self-Supporting Frame Glovebags on self-supporting frames can be used for some O&M activities on surfacing materials, and might be able to be adapted for other types of ACBM. The general procedures for using these units are as follows:

Construct a rectangular or square frame of 1 1/2" (38mm) diameter PVC or ABS pipe. Supporting legs can be made of lengths of pipe and fittings as needed to achieve the required height. Proprietary frames with telescoping legs are available.

To install glovebag on the frame, fold top edge of bag over the frame sides and extend the open edge of the bag at least 10" (25 cm) beyond the frame. Secure the open edges to the rest of the bag using duct tape. Place tools and supplies needed (see glovebag procedure above) in tool pouch inside glovebag.

Place frame and glovebag assembly below work location so that frame is close to, but not touching, ACBM. Location and proximity of frame to ACBM should allow for some movement without disturbing ACBM during the work.

Insert wand of garden sprayer with amended water into bag and seal in place.

Cut hole in glovebag for negative pressure equipment hose. Negative pressure equipment could be a HEPA vacuum or small negative pressure machine. Install hose and seal in place. A prefilter might be needed to prevent any gross ACBM debris from being drawn into the negative pressure device.

Install a hose from an operating HEPA vacuum into the bag in a position where it can be used during the work.

Turn on negative pressure device and smoke test all sides of glovebag frame unit to verify that negative pressure is present. If sufficient negative pressure is not present, reduce clearance between ACBM and frame (if possible), or add additional negative pressure device(s).

Insert hands into glove arms and wet ACBM where work is required. Perform work as needed. Caution: If bag is overloaded with tools or other materials, bag might break or release from frame.

HEPA vacuum and wet wipe tools and inside of bag. Adequately wet any ACBM debris in glovebag.

Slowly lower frame to allow tools to be removed from bag.

Gently remove glovebag from frame and twist to form a neck. Evacuate air from bag using HEPA vacuum and tape bag closed.

Remove garden sprayer wand, negative pressure device hose, and HEPA vacuum hose and seal holes with duct tape.

Place glovebag into a labeled 6 mil (0.15 mm) asbestos disposal bag and seal bag.

W-18 **Disposal of contaminated water** Contaminated water from O&M activities should be disposed of in accordance with all applicable federal, state and local regulations. Filtering might be required. If filtering is required, water should typically be filtered through a maximum 5 micron (5 μm) water filter before discharging water into a sanitary sewer system, if permitted. If a filter unit is not available at the work location, contaminated water can be put into leaktight drums and transported to a location with filtering equipment. If a portable shower unit with filtering equipment is available, contaminated water can be emptied into the shower and filtered through the shower filter system. The NIBS Asbestos Abatement and Management in Buildings: Model Guide Specifications Section 01563 "Decontamination Units" includes a specification for filtering equipment.

IV

Section IV Surfacing Materials Work Practices

Delete work practices that have been deemed not applicable to this report according to specific conditions in the facility. This may mean deleting only parts of the section or could require deletion of whole sections.

Example:

S3 1 2 3 Work in ceiling plenum space where exposed surfacing ACM is present . . . . . NOT APPLICABLE

Read all work practices carefully and revise accordingly.

When information is deleted in one section, make certain it is deleted through-out the manual and any other practices.

Also, edit page numbering to reflect these changes, if applicable. DO NOT renumber any procedures or practices.

Surfacing Materials Location Illustration 3

Code	Levels	Description	
S1	1 2 3	Moving one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM	4
S2	2 3	Attach component to an ACM finished surface that is above a non-asbestos-containing ceiling	8
S3	1 2 3	Work in ceiling plenum space where exposed surfacing ACM is present	12
S4	1 2 3	Install wiring in plenum space where exposed surfacing ACM is present	16
S5	2 3	Attach item to ceiling finished with ACM	20
S6	2 3	Repair or replace item in surface finished with ACM	23
S7	2 3	Cut or drill hole in surfacing ACM	27
S8	1	Replace bulbs in light fixture attached to or in surface finished with ACM	32
S9	1	Clean room with exposed surfaces finished with ACM	34
S10	1 2 3	Repair damaged surfacing ACM	36
S11	1 2 3	Accessing through an ACM finished surface	40
S12	1 2 3	Painting surfacing ACM	44
S13	2 3	Accessing a contaminated light fixture	48

The accompanying illustration depicts typical applications of the above work practices.

The following general notes should be reviewed by users of the surfacing work practices:

1. Appendix G of OSHA standard 29 CFR 1926.58 states that "maintenance staff employees should be instructed: Not to remove ceiling tiles below asbestos-containing materials without wearing the proper respiratory protection, clearing the area of other people, and observing asbestos waste disposal procedures."

2. Alternative equipment that might be used for certain operations include:

   A. Self-supporting glovebag/frame assemblies as described in General Procedure W9. These provide additional control for level 2 activities, or might be used instead of a mini-enclosure for some small level 3 operations.
   B. A funnel with a HEPA vacuum attached to the small end of the funnel might be used in some cases to contain debris.

3. Three primary types of surfacing ACM were identified in developing work practice examples:
   A. Acoustical Plaster
   B. Decorative Texture Finish
   C. Fireproofing

Definitions of all three are included in the glossary in Appendix E.

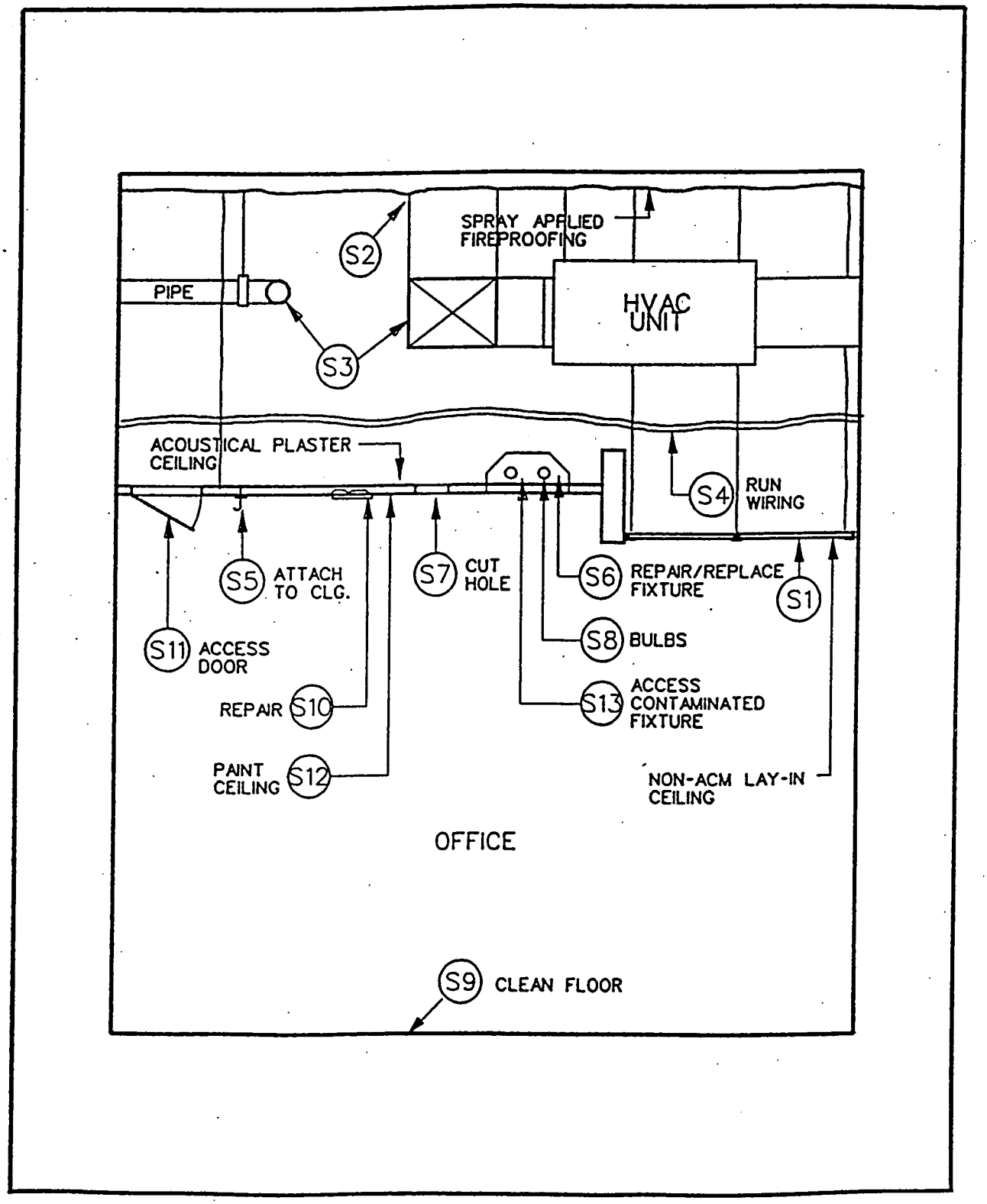
4. Careful work practices should be the primary means used to prevent releases of asbestos fibers during O&M work. Such practices include control measures such as wetting and local exhaust that control or collect fibers at the source. The goal of all asbestos O&M work should be to prevent any exposure of the worker and unnecessary contamination of the work area, drop cloths, mini-enclosures and other secondary control devices. Mini-enclosures should never be used to excuse sloppy work or creation of "bigger" messes.

Figure 7

The following illustration of O&M work practices for surfacing materials is an excellent reference document in determining relevant practices for your specific building. As stated elsewhere in this manual, if any work practice is deleted, do not renumber the remaining list; just note "not applicable". Such a foot note could also be made to the following illustration.

This illustration is not on diskette. However a copy of Figure 7 is provided in the front pouch of this notebook for your use. A copy of this sheet will need to be sent through the printer to add the title and footer which is found on the first page of the SUR1-7.wpf file.

Figure 7: Surfacing Materials Location Illustration



Work Practices (for EPA Standard Methods)

As particular building conditions warrant, the following work practices of the EPA Standard Methods should be modified. Modifications maybe as great as deleting the entire section because surfacing type materials are not present in the building. It may be only necessary to delete a particular practice, or to add or delete a recommended level for the practice. One suggested modification is to revise or add examples that are specific to the facility to better orient O&M workers to the building's O&M program.

Modifications are encouraged as a means of tailoring this master guidance document to your specific facility.

Modifications to "Related Work Practices" and "Worker Recommendations" of the NIBS document may also be necessary.

S1 . Summary

Moving one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM.

Summary

This work practice covers situations where you need to look into the plenum above a non-asbestos-containing ceiling which is installed below exposed surfacing ACM or situations where you need to work on a non-ACM ceiling system below exposed surfacing ACM. This is for individual small maintenance activities and should not be used for work such as replacing all ceiling panels in a room.

Such ceilings may be contaminated by dust and/or debris from damaged surfacing ACM.

Note: Appendix G of OSHA standard 29 CFR 1926.58 states that "maintenance staff employees should be instructed: Not to remove ceiling tiles below asbestos-containing materials without wearing the proper respiratory protection, clearing the area of other people, and observing asbestos waste disposal procedures". Personnel performing this work should be properly trained and protected.

Examples

Level 1:	A.	Move one non-ACM ceiling panel in a lay-in ceiling below exposed surfacing ACM in good condition to make observations.
Level 2:	A.	Install or replace an HVAC diffuser in non-ACM ceiling where plenum space contains exposed surfacing ACM in good or fair condition.
	B.	Move or replace non-ACM ceiling panels in a lay-in ceiling below exposed surfacing ACM in good or fair condition.
Level 3:	A.	Install or replace light fixture in non-ACM ceiling where plenum space contains exposed surfacing ACM in poor condition.
	B.	Move non-ACM ceiling panels to access plenum area where dust and/or debris from surfacing is present on top of ceiling.

Related Work Practices

S2 - Attach item to an ACM finished surface that is above a ceiling.
S3 - Work in ceiling plenum space where exposed surfacing ACM is present.
S4 - Install wiring in plenum space where exposed surfacing ACM is present.

S1 . Level 1

Moving one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM

Example Level 1: A. Move a non-ACM ceiling panel in a lay-in ceiling below exposed surfacing ACM in good condition to make observations.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Appendix G of OSHA standard 29 CFR 1926.58 states that "maintenance staff employees should be instructed: Not to remove ceiling tiles below asbestos-containing materials without wearing the proper respiratory protection, clearing the area of other people, and observing asbestos waste disposal procedures".

Work Practice

1. Perform Pre-work activities on Level 1 Worker Checklist.
2. See General Procedure W1 for standard tools, equipment and materials list.
3. Place ladder or scaffold in work area.
4. Carefully lift up ceiling panel. If lifting is obstructed by wires, ducts, conduit, etc., move to another panel. Keep panel as flat as possible while lifting panel. Lift panel slightly above grid system and slowly slide panel to one side, leaving panel on top of an adjacent panel.
5. Wet wipe or HEPA vacuum the underside of the panel which was moved. Carefully replace ceiling panel and complete applicable steps on Level 1 Worker Checklist to complete work.

S1 . Level 2

Moving one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM

Examples Level 2:

A. Install or replace an HVAC diffuser in non-ACM ceiling where plenum space contains exposed surfacing ACM in good or fair condition.

B. Move or replace non-ACM ceiling panels in a lay-in ceiling below exposed surfacing ACM in good or fair condition.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Appendix G of OSHA standard 29 CFR 1926.58 states that "maintenance staff employees should be instructed: Not to remove ceiling tiles below asbestos-containing materials without wearing the proper respiratory protection, clearing the area of other people, and observing asbestos waste disposal procedures".

Work Practice

1. Perform Pre-work activities on Level 2 Worker Checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Tools and materials needed for work on ceiling
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Carefully lift up ceiling panel while HEPA vacuuming around edges of panel. Keep panel as flat as possible while lifting panel. Lift panel slightly above grid system and slowly slide panel to one side, leaving panel on top of an adjacent panel.
6. Lightly mist top side of ceiling where work will occur using garden sprayer with amended water.
7. Pick up any bulk debris on top of ceiling panels where work will occur and place into disposal bags.
8. HEPA vacuum ceiling suspension system and top side of ceiling where work will occur.
9. Wet wipe or HEPA vacuum the underside of the panel which was moved. Carefully replace ceiling panel and perform work required and clean-up and tear-down steps on Level 2 Worker Checklist to complete work.

S1 . Level 3

Moving one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM.

Examples

Level 3:

A. Install or replace light fixture in non-ACM ceiling where plenum space contains exposed surfacing ACM in poor condition.

B. Move non-ACM ceiling panels to access plenum area where dust and/or debris from surfacing is present on top of ceiling.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Appendix G of OSHA standard 29 CFR 1926.58 states that "maintenance staff employees should be instructed: Not to remove ceiling tiles below asbestos-containing materials without wearing the proper respiratory protection, clearing the area of other people, and observing asbestos waste disposal procedures".

Work Practice

1. Perform Pre-work activities on Level 3 Worker Checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Tools and materials needed for work on ceiling
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Carefully lift up ceiling panel while HEPA vacuuming around edges of panel. Keep panel as flat as possible while lifting panel. Lift panel slightly above grid system and slowly slide panel to one side, leaving panel on top of an adjacent panel.
6. Lightly mist top side of ceiling where work will occur using garden sprayer with amended water.
7. Pick up any bulk debris on top of ceiling panels where work will occur and place into disposal bags.
8. HEPA vacuum ceiling suspension system and top side of ceiling where work will occur.
9. Wet wipe or HEPA vacuum the underside of the panel which was moved. Carefully replace ceiling panel and perform clean-up and tear-down steps on Level 3 Worker Checklist to complete work.

S2 . Summary

Attach component to an ACM finished surface that is above a non-asbestos-containing ceiling.

Summary This work practice covers the procedures for attaching components to an ACM finished surface (such as spray-applied fireproofing) that is located above a non-asbestos-containing ceiling. This surface can be above an ACM or non-ACM ceiling.

Examples

Level 2:

A. Removing a small area of ACM fireproofing using a negative pressure glovebag frame unit.

Level 3:

A. Attaching a pipe, ceiling or duct hanger to a deck or beam covered with ACM fireproofing, insulation or overspray.

B. Attaching a pipe, ceiling or duct hanger to an old acoustical plaster ceiling above a lay-in ceiling system.

Related Work Practices

S1 - Moving one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM.
S5 - Attach component to ceiling finished with ACM.
S7 - Cut hole in surfacing ACM.

Worker Recommendations

One worker is usually sufficient for Level 2. Two workers for Level 3. More workers may be needed for Level 2 and Level 3 to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

S2. Level 2

Attach component to an ACM finished surface that is above a non-asbestos-containing ceiling.

Example Level 2: A. Removing a small area of ACM fireproofing using a negative pressure glovebag frame unit.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment & materials list).
   - Negative pressure glovebag frame unit
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
   - Maintenance item(s) to be attached to surface
   - Non-ACM surfacing repair material
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed into work area. Include a HEPA vacuum for use with negative pressure glovebag frame unit.
5. Obtain access through ceiling using O & M work practice selected (see note above step 1).
6. HEPA vacuum area above ceiling within reach from access hole.
7. Install glovebag frame unit under area where ACM removal is needed. Do not contact ACM with frame.
8. Insert wand of garden sprayer with amended water through glovebag and adequately wet area of surfacing to be removed. Allow water to soak in for several minutes. Wet removal area frequently during removal of bulk material and residual material. Using glovebag procedures (see General Procedure W17), scrape off ACM to at least 3" (75 mm) beyond area where item will be attached. When bulk material is removed, wet newly exposed areas and use scraper and nylon brush to remove remaining visible residual ACM. Place removed ACM into disposal bags.
9. Perform maintenance work, repair area with new non-ACM surfacing, and perform clean-up and tear-down steps on Level 2 checklist to complete work.

S2 . Level 3

Attach component to an ACM finished surface that is above a non-asbestos-containing ceiling.

Examples Level 3:

A. Attach a pipe, ceiling or duct hanger to a deck or beam covered with ACM fireproofing or insulation.

B. Attach a pipe, ceiling or duct hanger to an old acoustical plaster ceiling above a lay-in ceiling system.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment & materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
   - Maintenance item(s) to be attached to surface
   - Non-ACM surfacing repair material
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Enter enclosure and obtain access through ceiling using O & M work practice selected (see note above step 1).
6. HEPA vacuum area above ceiling within reach from access hole.
7. Extend mini-enclosure above ceiling, if feasible, using polyethylene sheet and framing taped together to provide enclosure around the work area without contacting ACM covered surface. The construction of an extended mini-enclosure will vary depending on the existing construction above the ceiling. Polyethylene and framing may be secured to pipes, conduit, and metal hangers if they are not covered with ACM. If an extended mini-enclosure is not feasible, mist area above ceiling and lay a polyethylene drop cloth below the area where removal is required. If drop cloth cannot be used, suspend polyethylene below immediate work area to catch ACM to be removed. Worker should be located to one side of removal area (inside enclosure) during removal.

8. Adequately wet area of surfacing to be removed using garden sprayer containing amended water and allow water to soak in for several minutes. Wet removal area frequently during removal of bulk material and residual material. Using scraper with HEPA vacuum within several inches of removal area, scrape off ACM to at least 3" (75 mm) beyond area where item will be attached. When bulk material is removed, wet newly exposed areas and use scraper and nylon brush to remove remaining visible residual ACM. Place removed ACM into disposal bags.
9. Perform maintenance work, repair area with new non-ACM surfacing, and perform clean-up and tear-down steps on Level 3 checklist to complete work.

S3 . Summary

Work in ceiling plenum space where exposed surfacing ACM is present.

Summary This work practice covers situations where work must be performed in a ceiling plenum space that has exposed surfacing ACM.

Examples

Level 1: (If work is likely to disturb ACM, use Level 2)

A. Open or close one valve above ceiling where exposed fireproofing in good condition is present.

B. Inspect HVAC mixing box below asbestos-containing fireproofing in good condition.

Level 2:

A. Install new conduit (attached to existing supports) in plenum space where exposed fireproofing in good condition is present.

B. Repair leak in non-ACM insulated water line above ceiling where exposed surfacing ACM is present.

C. Maintain HVAC mixing box below asbestos-containing fireproofing in good condition.

Level 3:

A. Replace HVAC mixing box above ceiling where dust or debris from surfacing ACM is present.

B. Repair piping below surfacing ACM in poor condition.

Related Work Practices

S1 - Moving one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM.
S2 - Attach component to an ACM finished surface that is above a ceiling.
S4 - Install wiring in plenum space where ACM is present.
M28 - Remove HVAC filters in unit serving plenum space with exposed ACM.

Worker Recommendations

One worker is usually sufficient for Level 1 and Level 2. Two workers for Level 3. More workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

S3 . Level 1

Work in ceiling plenum space where exposed surfacing ACM is present.

Examples Level 1:

A. Open or close one valve above ceiling where exposed fireproofing in good condition is present.

B. Inspect HVAC mixing box below asbestos-containing fireproofing in good condition.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices S1, M11, M13 or M25.** Appendix G of OSHA standard 29 CFR 1926.58 states that "maintenance staff employees should be instructed: Not to remove ceiling tiles below asbestos-containing materials without wearing the proper respiratory protection, clearing the area of other people, and observing asbestos waste disposal procedures".

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Maintenance item(s) required to perform work in plenum space
3. Place tools, equipment and materials needed in work area.
4. Obtain access above ceiling using O & M work practice selected (see note above step 1).
5. Perform maintenance work required and complete applicable steps on Level 1 checklist to complete work.

S3 . Level 2

Work in ceiling plenum space where exposed surfacing ACM is present.

Examples Level 2:

A. Install new conduit in plenum space where exposed fireproofing in good condition is present.
B. Repair leak in water line above ceiling where exposed surfacing ACM is present.
C. Maintain HVAC mixing box below asbestos-containing fireproofing in good condition.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices S1, M11, M13 or M25.** Appendix G of OSHA standard 29 CFR 1926.58 states that "maintenance staff employees should be instructed: Not to remove ceiling tiles below asbestos-containing materials without wearing the proper respiratory protection, clearing the area of other people, and observing asbestos waste disposal procedures".

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Maintenance item(s) required to perform work in plenum space.
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Obtain access above ceiling using O & M work practice selected (see note above step 1).
6. Pick up any bulk debris within reach on top of ceiling and place into disposal bags.
7. HEPA vacuum top side of ceiling within reach from access area.
8. HEPA vacuum and wet-wipe surfaces that will be contacted or item to be maintained or repaired.
9. Perform maintenance work required and clean-up and tear-down steps on Level 2 checklist to complete work.

S3 . Level 3

Work in ceiling plenum space where exposed surfacing ACM is present.

Examples Level 3:

A. Replace HVAC mixing box above ceiling where dust or debris from surfacing ACM is present.

B. Repair piping below surfacing ACM in poor condition.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices S1, M11, M13 or M25.** Appendix G of OSHA standard 29 CFR 1926.58 states that "maintenance staff employees should be instructed: Not to remove ceiling tiles below asbestos-containing materials without wearing the proper respiratory protection, clearing the area of other people, and observing asbestos waste disposal procedures".

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Maintenance item(s) required to perform work in plenum space.
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Obtain access above ceiling using O & M work practices selected (see note above step 1). Pick up any bulk debris within reach on top of ceiling and place into disposal bags.
6. HEPA vacuum top side of ceiling within reach from access area, and HEPA vacuum and wet-wipe item to be repaired or replaced.
7. Perform maintenance work required and clean-up and tear-down steps on Level 3 checklist to complete work.

S4 . Summary

Install wiring in plenum space where exposed surfacing ACM is present.

Summary This work practice covers situations where small amounts of wiring and/or conduit are being installed in a ceiling plenum space that has exposed surfacing ACM. The procedures assume that the ACM will not intentionally be disturbed during the work.

Examples

Level 1:
- A. Installing new wiring in existing conduit that does not have overspray ACM on conduit. Movement in conduit should not disturb ACM.

Level 2:
- A. Install new conduit attached to existing support brackets.
- B. Reroute conduit that can be attached to existing support brackets.

Level 3:
- A. Installing new plenum rated computer or telephone cables that will lay on top of ceiling.

Related Work Practices

S1 - Moving one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM.
S2 - Attach component to an ACM finished surface that is above a ceiling.
S3 - Work in ceiling plenum space where exposed surfacing ACM is present.

Worker Recommendations

One worker for Level 1 and Level 2. Two workers may facilitate pulling wires between two locations. Two workers for Level 3. A person with air monitoring training might be required. This person can be one of the workers.

S4 . Level 1

Install wiring in plenum space where exposed surfacing ACM is present.

Example Level 1: A. Install new wiring in existing conduit that does not have overspray ACM on conduit. Movement in conduit should not disturb ACM.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices S1, M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Wiring and related tools
3. Place tools, equipment and materials needed in work area.
4. Obtain access through ceiling using O & M work practice selected (see note above step 1).
5. Run wiring as required. Do not contact exposed ACM surfacing and minimize disturbance of ceiling system and other components above ceiling while running wiring.
6. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

S4 . Level 2

Install wiring in plenum space where exposed surfacing ACM is present.

Examples Level 2:

A. Install new conduit attached to existing support brackets.

B. Reroute conduit that can be attached to existing support brackets.

C. Install new cables that will lay on top of ceiling where no dust or debris is present.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices S1, M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Wiring and related tools
3. Prepare work area with drop cloth. See General Procedure W9. Set up multiple work areas if needed.
4. Place tools, equipment and materials needed onto drop cloth.
5. Obtain access through ceiling using O & M work practice selected (see note above step 1). HEPA vacuum top side of ceiling within reach from access area.
6. Run wiring as required. Do not contact exposed ACM surfacing and minimize disturbance of ceiling system and other components above ceiling while running wiring.
7. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

S4 . Level 3

Install wiring in plenum space where exposed surfacing ACM is present.

Example Level 3: A. Install new cables that will lay on top of ceiling where visible dust or debris is present.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate this work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices S1, M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Wiring and related tools
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system. See General Procedure W9. Set up multiple enclosures if needed.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Enter enclosure and obtain access through ceiling using O & M work practice selected (see note above step 1). HEPA vacuum top side of ceiling within reach from access hole.
6. Mist top side of ceiling in work area where dust or debris is present and run wiring as required. Do not contact exposed ACM surfacing and minimize disturbance of ceiling system and other components above ceiling while running wiring.
7. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

S5 . Summary

Attach item to ceiling finished with ACM.

Summary This work practice describes the work required to attach an item to a ceiling finished with surfacing ACM, such as acoustical plaster or a decorative sprayed-on surface texture material.

Examples

Level 2:

A. Attach a battery-powered smoke detector to acoustical plaster.

B. Attach track lighting to an ACM finished ceiling where experience has proven a minimal disturbance will occur.

Level 3:

A. Attach track lighting system to ACM finished ceiling.

B. Install exposed conduit, junction boxes and light fixtures to ACM finished ceiling.

C. Attach new folding door to acoustical plaster where structural modifications are not needed for support.

Related Work Practices

S1 - Move one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM.

S2 - Attach component to an ACM finished surface that is above a ceiling.

S7 - Cut or drill hole in Surfacing ACM.

S8 - Replace bulbs in light fixture attached to or in surface finished with ACM.

Worker Recommendations

One worker for Level 2. Two workers for Level 3. More workers may be needed for certain Level 3 tasks. A person with air monitoring training might be required. This person can be one of the workers.

S5 . Level 2

Attach item to ceiling finished with ACM.

Examples Level 2:

A. Attach a battery-powered smoke detector to acoustical plaster.

B. Attach track lighting to an ACM finished surface where experience has proven a minimal disturbance will occur.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Appendix G to OSHA regulation 29 CFR 1926.58 states: "The training program for the maintenance engineering staff should describe methods of handling asbestos-containing materials as well as routine maintenance activities that are prohibited when asbestos-containing materials are involved. For example, maintenance staff employees should be instructed: Not to hang plants or pictures on structures covered with asbestos-containing materials."

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Item to be attached to ceiling and related tools
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Wet area on ceiling where item will be attached using garden sprayer with amended water.
6. Using hand tools and HEPA vacuum near attachment location, or power tools with attached HEPA vacuum, attach item to ceiling. If small holes are being drilled, they can be drilled through a wet sponge or shaving cream to control fiber release.

   If a wet sponge or shaving cream is not appropriate or adequate, scrape away surfacing to at least 1/2" [13 mm] beyond where hole is needed. Keep the hose of an operating HEPA vacuum within 6" [150mm] of where scraping is occurring. Adequately wet scraping area and any dust or debris generated. Drill hole through substrate after ACM is removed. Place all debris and sponges into ACM disposal bags.
7. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

S5 . Level 3

Attach item to ceiling finished with ACM.

Examples Level 3:

A. Attach track lighting system to ACM finished ceiling.
B. Install exposed conduit, junction boxes and light fixtures to ACM finished ceiling.
C. Attach new folding door to acoustical plaster where structural modifications are not needed for support.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Appendix G to OSHA regulation 29 CFR 1926.58 states: "The training program for the maintenance engineering staff should describe methods of handling asbestos-containing materials as well as routine maintenance activities that are prohibited when asbestos-containing materials are involved. For example, maintenance staff employees should be instructed: Not to hang plants or pictures on structures covered with asbestos-containing materials."

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Special tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Item to be attached to ceiling and related tools
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Enter enclosure and wet area on ceiling where item will be attached using garden sprayer with amended water.
6. Using hand tools (or power tools with attached HEPA vacuum) attach item to ceiling. If small holes are being drilled, they can be drilled through a wet sponge or shaving cream to control fiber release.

   If a wet sponge or shaving cream is not appropriate or adequate, scrape away surfacing to at least 1/2" [13 mm] beyond where hole is needed. Keep the hose of an operating HEPA vacuum within 6" [150 mm] of where scraping is occurring. Adequately wet scraping area and any dust or debris generated. Drill hole through substrate after ACM is removed. Adequately wet any dust or debris that is generated. Place all debris and sponges into ACM disposal bags.
7. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

S6 . Summary

Repair or replace item in surface finished with ACM.

Summary This work practice covers the procedures for repairing or replacing an item that is installed in or attached to a surface finished with ACM, such as an acoustical plaster ceiling or fireproofed deck or beam.

Examples

Level 1:
- A. Replace light fixture in ceiling finished with ACM where a disturbance of ACM is not expected.
- B. Replace venetian blinds attached to a surface finished with ACM.

Level 2:
- A. Replacement of ballast in recessed light fixture attached in acoustical plaster ceiling where ACM may be disturbed.
- B. Diffuser repair in acoustical plaster ceiling.
- C. Replace light fixture in ceiling finished with asbestos-containing decorative textured finish that may be disturbed.

Level 3:
- A. Replace electrical panel attached to fireproofed column.
- B. Replace access panel in ceiling finished with ACM.
- C. Replace HVAC unit attached to poor condition acoustical plaster ceiling.

Related Work Practices

S1 - Moving one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM.
S5 - Attach item to ceiling finished with ACM.
S7 - Cut or drill hole in Surfacing ACM.
S8 - Replace bulbs in light fixture attached to or in surface finished with ACM.
S10 - Repair damaged surfacing ACM.

Worker Recommendations

One worker is usually sufficient for Level 1 and Level 2. Two workers for Level 3. More workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

S6 . Level 1

Repair or replace item in surface finished with ACM.

Examples Level 1:

A. Replace light fixture in ceiling finished with ACM where a disturbance of ACM is not expected.

B. Replace venetian blinds attached to a surface finished with ACM.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Repair and/or replacement parts and tools as needed
3. Prepare work area with drop cloth, (if desired). See General Procedure W9.
4. Place tools, equipment and materials needed in work area or on drop cloth.
5. Lightly mist area of surfacing within 6" [150 mm] of item to be repaired or replaced using garden sprayer containing amended water and allow water to soak in for several minutes.
6. Wet wipe exposed surfaces of maintenance item to be repaired or replaced.
7. Carefully perform repair work or remove and replace maintenance item. If item is to be removed, repaired, and then reinstalled, clean item with HEPA vacuum and/or wet wiping before reinstalling. If item will be disposed of, clean (if possible) using HEPA vacuum and/or wet wiping and dispose of as non-ACM waste. If visible debris is not removed, dispose of as ACM or as required by applicable regulations.
8. Collect any surfacing debris from repair/replacement work using HEPA vacuum.
9. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

S6 . Level 2

Repair or replace item in surface finished with ACM.

Examples Level 2:

A. Replacement of ballast in recessed light fixture attached in acoustical plaster ceiling where ACM may be disturbed.

B. Diffuser repair in acoustical plaster ceiling.

C. Replace light fixture in ceiling finished with asbestos-containing decorative texture finish that may be disturbed.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Repair and/or replacement parts and tools as needed
3. Prepare work area with drop cloth, (if desired). See General Procedure W9.
4. Place tools, equipment and materials needed in work area or on drop cloth.
5. Lightly mist area of surfacing within 6" [150 mm] of item to be repaired or replaced using garden sprayer containing amended water and allow water to soak in for several minutes.
6. Wet wipe exposed surfaces of maintenance item to be repaired or replaced.
7. Carefully perform repair work or remove and replace maintenance item. If item is to be removed, repaired, and then reinstalled, clean item with HEPA vacuum and/or wet wiping before reinstalling. If item will be disposed of, clean (if possible) using HEPA vacuum and/or wet wiping and dispose of as non-ACM waste. If visible debris is not removed, dispose of as ACM or as required by applicable regulations.
8. Collect any surfacing debris from repair/replacement work using HEPA vacuum.
9. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

S6 . Level 3

Repair or replace item in surface finished with ACM.

Examples Level 3:

A. Replace electrical panel attached to fireproofed column.
B. Replace access panel in ceiling finished with ACM.
C. Replace HVAC unit attached to poor condition acoustical plaster ceiling.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate this work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Repair and/or replacement parts and tools as needed
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for use during the work.
5. Enter enclosure and lightly mist area of surfacing within 6" [150 mm] of item to be replaced using garden sprayer containing amended water and allow water to soak in for several minutes.
6. Wet wipe exposed surfaces of maintenance item to be repaired or replaced.
7. Carefully perform repair work or remove and replace maintenance item. If item is to be removed, repaired, and then reinstalled, clean item with HEPA vacuum and/or wet wiping before reinstalling. If item will be disposed of, clean (if possible) using HEPA vacuum and/or wet wiping and dispose of as non-ACM waste. If visible debris is not removed, dispose of as ACM or as required by applicable regulations.
8. Collect any surfacing debris from repair/replacement work using HEPA vacuum.
9. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

S7 . Summary

Cut or drill hole in surfacing ACM.

Summary This work practice covers the work required to cut or drill a hole through surfacing ACM, such as acoustical plaster or fireproofing. If possible, ACM should be removed before holes are drilled. If holes are drilled in an ACM wall surface with a cavity behind the wall, labels or recordkeeping information should note that ACM might be present in the cavity.

Examples

Level 2:

A. Install a few new conduits through fireproofed metal deck.

B. Drill a hole through asbestos-containing decorative texture finish.

C. Drill a hole using a drill with HEPA filtered dust collection.

Level 3:

A. Drill or cut hole for pipe or duct chase using tools with or without HEPA filtered dust collection in an enclosure.

Related Work Practices

S1 - Move one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM.
S2 - Attach component to an ACM finished surface that is above a ceiling.
S5 - Attach item to ceiling finished with ACM.
S6 - Repair or replace item in surface finished with ACM.

Worker Recommendations

One worker is usually sufficient for Level 2. Two workers for Level 3. More workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

S7 . Level 2

Cut or drill hole in surfacing ACM.

Examples Level 2:

A. Install a few new conduits through fireproofed metal deck.

B. Drill a hole through asbestos-containing decorative texture finish.

C. Drill a hole using a drill with HEPA filtered dust collection.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices S1, M11, M13.** Appendix G to OSHA regulation 29 CFR 1926.58 states: "The training program for the maintenance engineering staff should describe methods of handling asbestos-containing materials as well as routine maintenance activities that are prohibited when asbestos-containing materials are involved. For example, maintenance staff employees should be instructed: Not to drill holes in asbestos-containing materials".

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Scraper (if used)
   - Hand tools, or power tools with HEPA filtered dust collection as required to cut hole.
   - Wet sponge or shaving cream (if used)
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth. If access above ceiling is required, obtain access using O & M work practice selected (see note above step 1).
5. If hole is being drilled through a surface, such as acoustical plaster, where back side is inaccessible, use the procedures in step 6. If hole is being drilled through a surface, such as a fireproofed metal deck, where both sides are accessible, use the procedures in step 7.
6. A. Install polyethylene sheet below removal location to catch any falling debris.
   B. Adequately wet area where hole is to be drilled.
   C. (1) Small holes can be drilled through a wet sponge or shaving cream. See C(2) for alternative methods. After drilling, remove shaving cream using wet/dry type HEPA vacuum.

(2) If a wet sponge or shaving cream is not appropriate or adequate, scrape away surfacing to at least 1/2" [13 mm] beyond where hole is needed. Keep the hose of an operating HEPA vacuum within 6" [150mm] of where scraping is occurring. Adequately wet scraping area and any dust or debris generated. Drill hole through substrate after ACM is removed.

D. Place HEPA vacuum hose near or through hole and run for several minutes to clean air on backside of surface.

7. A. If hole is drilled from top side of deck, adequately wet ACM on underside and install polyethylene sheet or enclosure below ACM on underside that will catch any falling debris, including material from hole (such as a concrete cylinder). (If hole is drilled from underside, see step B). Drill hole through surface. Adequately wet drilling area while drilling. Wet any debris on drop cloth or in enclosure on underside, package up debris and drop cloth/enclosure and dispose of as ACM.

B. If hole is drilled from underside of deck, follow steps 6A, 6B and 6C(2).

8. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

S7 . Level 3

Cut or drill hole in surfacing ACM.

Example Level 3: A. Drill or cut hole for pipe or duct chase using tools with or without HEPA filtered dust collection in an enclosure.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate this work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices S1, M11, M13 or M25.** Appendix G to OSHA regulation 29 CFR 1926.58 states: "The training program for the maintenance engineering staff should describe methods of handling asbestos-containing materials as well as routine maintenance activities that are prohibited when asbestos-containing materials are involved. For example, maintenance staff employees should be instructed: Not to drill holes in asbestos-containing materials".

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Scraper
   Hand or power drill or saw. Power tools shall have HEPA vacuum attachment.
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for use during the work. IF access above is required, obtain access using O & M work practice selected (see note above step 1). If surface to be drilled is above a ceiling, extend enclosure (if feasible) to within approximately 1/2" [13 mm] of surfacing ACM.
5. Enter enclosure. If hole is being drilled through a surface, such as acoustical plaster where back side is inaccessible, use the procedures in step 6. If hole is being drilled through a surface, such as a fireproofed metal deck, where both sides are accessible, use the procedures in step 7.
6. A. Inside enclosure, install polyethylene sheet below removal location to catch any falling debris.
   B. Adequately wet area where hole is to be drilled.
   C. (1) Small holes can be drilled through a wet sponge or shaving cream. See C(2) for alternative methods. After drilling, remove shaving cream using wet/dry type HEPA vacuum.

(2) If a wet sponge or shaving cream is not appropriate or adequate, scrape away surfacing to at least 1/2" [13 mm] beyond where hole is needed. Keep the hose of an operating HEPA vacuum within 6" [150 mm] of where surveying is occurring. Adequately wet, any dust or debris generated. Drill surveying area and hole through substrate after ACM is removed.

D. Place HEPA vacuum hose near or through hole and rim for several minutes to clean air on backside of surface.

7. A. If hole is drilled from top side of deck, adequately set ACM on underside and install enclosure below ACM on underside that will catch any falling debris, including material from hole (such as a concrete cylinder). (If hole is drilled from underside, see step B). Drill hole through surface. Adequately wet drilling area while drilling. Wet any debris in enclosure on underside, package up debris and enclosure and dispose of as ACM.

B. If hole is drilled from underside of deck, provide an enclosure on top side where hole will penetrate deck and follow steps 6A, 6B, 6C(2), and 6D.

8. Let HEPA vacuum run for at least 15 minutes to clean air in enclosure.

9. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

S8 . Summary

Replace bulbs in light fixture attached to or in surface finished with ACM.

Summary This work practice covers procedures for replacing light bulbs in a fixture attached to a surface finished with ACM. Light fixtures attached to or in surfaces finished with ACM can cause damage to ACM if the fixtures are moved during maintenance work.

Examples Level 1:

A. Replace bulbs in recessed or pendant mount light fixtures attached to an asbestos-containing decorative texture finish or acoustical plaster ceiling where disturbance of ACM is unlikely.

B. Replace bulbs in fixtures mounted on fireproofed surface where disturbance of ACM is unlikely.

Related Work Practices

S5 - Attach item to ceiling finished with ACM.
S10 - Repair damaged surfacing ACM.
S13 - Access into contaminated light fixture.

Worker Recommendations

One worker is usually sufficient. Two or more workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

S8 . Level 1

Replace bulbs in light fixture attached to or in surface finished with ACM.

Examples Level 1:

A. Replace bulbs in recessed or pendant mount light fixtures attached to an asbestos-containing decorative texture finish or acoustical plaster ceiling where disturbance of ACM is unlikely.

B. Replace bulbs in fixtures mounted on fireproofed surface where disturbance of ACM is unlikely.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Special tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Replacement bulbs
3. Place tools, equipment and materials needed in work area.
4. Carefully replace light bulbs without jarring fixture. Clean-up any dust or debris generated using HEPA vacuum.
5. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

S9 . Summary

Clean room with exposed surfaces finished with ACM.

Summary This work practice covers the procedures for cleaning a room with exposed surfaces finished with ACM. This room has been predetermined to not be contaminated or has previously been cleaned. This is **not** the procedure to use if a fiber release has occurred. See related work practices below.

Examples Level 1:

A. Routine cleaning in room with spray-applied acoustical plaster on walls or ceilings where there is no visible dust or debris.

B. Routine cleaning in mechanical room with exposed fireproofing in good condition where there is no visible dust or debris.

Related Work Practices

S10 - Repair damaged surfacing ACM.
T6 - Repair damaged thermal system insulation on a pipe.
M8 - Clean resilient asbestos flooring.
M29 - Clean up debris from minor fiber release.

Worker Recommendations

One worker.

S9 . Level 1

Clean room with exposed surfaces finished with ACM.

Examples Level 1:

A. Routine cleaning in room with spray applied acoustical plaster on walls or ceilings where there is no visible debris.

B. Routine cleaning in mechanical room with exposed fireproofing in good condition where there is no visible debris.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

If any debris from ACM is found in an area to be cleaned, notify the APM or your supervisor. The APM will need to determine whether this work practice is appropriate or if more stringent practices are needed.

Work Practice

1. Tools, equipment and materials: Standard cleaning equipment and materials.
2. Clean area using standard cleaning methods. Avoid contact with any ACM materials that could be damaged during cleaning. The APM will select the appropriate work practice and personnel to clean up any debris from ACM.

   The following precautions should be observed when working around the ACM:

   A). Do not bump ACM with vacuum cleaners, broom handles, mop handles or similar objects. Do not exhaust vacuum cleaners toward ACM.

   B). Do not brush ACM surfaces with a broom or similar objects to remove cobwebs or other items attached to ACM.

S10 . Summary

Repair damaged surfacing ACM.

Summary This work practice covers the procedures for repairing small amounts of damaged surfacing ACM, such as acoustical plaster or fireproofing. The procedure assumes that the damage is in isolated areas not greater in size than the OSHA small scale, short duration project limits.

Examples

Level 1:
- A. Repair small hole in acoustical plaster ceiling or wall without disturbing surrounding plaster.
- B. Repair small gouged area in asbestos-containing decorative texture finish without disturbing surrounding finish.

Level 2:
- A. Repair gouge marks in acoustical plaster ceiling where a small amount of damaged ACM is present.
- B. Repair small area of delaminated acoustical plaster in good condition.

Level 3:
- A. Install fire rated enclosure over small area of damaged fireproofing.
- B. Trowel-on fireproofing to repair small water damaged area.
- C. Repair delaminated plaster in fair condition.

Related Work Practices

S2 - Attach component to an ACM finished surface that is above a ceiling.
S5 - Attach item to ceiling finished with ACM.

Worker Recommendations

One worker is usually sufficient for Level 1 and Level 2. Two workers for Level 3. More workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

S10 . Level 1

Repair damaged surfacing ACM.

Examples Level 1:

A. Repair small hole in acoustical plaster ceiling or wall without disturbing surrounding plaster.

B. Repair small gouged area in asbestos-containing decorative texture finish without disturbing surrounding finish.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).

   Non-ACM caulking materials & tools
3. Place tools, equipment and materials needed in work area.
4. Repair damaged area using non-ACM caulking without disturbing ACM. Do not scrape or sand existing ceiling.
5. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

S10 . Level 2

Repair damaged surfacing ACM.

Examples Level 2:

A. Repair gouge marks in acoustical plaster ceiling where a small amount of damaged ACM is present.

B. Repair small area of delaminated acoustical plaster in good condition.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Small stiff-bladed scraper
   - Non-ACM repair materials & tools
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Mist any damaged surfacing using garden sprayer containing amended water and allow water to soak in for several minutes.
6. With HEPA vacuum within several inches of damaged area, remove any loose material by hand or with scraper. Collect material in disposal bags as it is removed. Remove material around edges of damaged area until well-adhered material is found, but do not remove beyond area protected by drop cloth. Mist removal area during removal of damaged material.
7. Repair damaged area using non-ACM and perform clean-up and tear-down steps on Level 2 checklist to complete work.

S10 . Level 3

Repair damaged surfacing ACM.

Examples Level 3:

A. Install fire rated enclosure over small area of damaged fireproofing.

B. Trowel-on fireproofing to repair small water damaged area.

C. Repair delaminated plaster in fair condition.

Notes

This work practice must be used in conjunction with a Worker Checklist for Level 3 Work Practices. General Procedures W1 and W9 are used.

The checklist includes tasks that must be performed before these work practices are used.

Coordinate this work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices, S1, M11, M13 or M25.** If ACM is in poor condition, abatement may need to be considered for the damaged area.

Work Practice

1. Perform pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Small stiff-bladed scraper
   - Non-ACM repair materials & tools
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for use during repair work. If access above ceiling is required, obtain access using O&M work practice selected (see note above step 1).
5. Adequately wet area of damaged surfacing using garden sprayer containing amended water and allow water to soak in for several minutes.
6. With HEPA vacuum within several inches of damaged area, remove any loose material by hand or with scraper. Collect material in disposal bags as it is removed. Remove material around edges of damaged area until well-adhered material is found, but do not remove beyond area protected inside enclosure. Mist removal area during removal of damaged material.
7. Repair damaged area using non-ACM materials.
8. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

S11 . Summary

Accessing through an ACM finished surface.

Summary This work practice covers the procedures for opening access doors (such as those used in a wall or ceiling to access valves or dampers) in ACM finished surfaces such as acoustical plaster or fireproofing.

Examples

Level 1:
- A. Open access door in acoustical plaster ceiling that has been opened before. Ceiling or wall is in good condition and debris is not likely on door.

Level 2:
- A. Open access door in acoustical plaster ceiling where ACM is in fair condition and may be disturbed.

Level 3:
- A. Open access door that has surfacing material on flanges that will be disturbed when door is opened.
- B. Open access door in acoustical plaster or fireproofed surface where ACM is in poor condition or a significant amount of ACM debris may be present on back side of door.

Related Work Practices

S5 - Attach item to ceiling finished with ACM.
S6 - Repair or replace item in surface finished with ACM.
S7 - Cut or drill hole in Surfacing ACM.

Worker Recommendations

One worker for Level 1 work. One or two workers for Level 2 depending upon safety and efficiency considerations. Two workers for Level 3. A person with air monitoring training might be required. This person can be a worker.

S11 . Level 1

Accessing through an ACM finished surface.

Example Level 1: A. Open access door in acoustical plaster ceiling or wall that has been opened before. Ceiling or wall is in good condition and debris is not likely on door.

Notes This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Sponge
3. Place tools, equipment and materials needed in work area.
4. Unlatch door and open carefully.
5. Perform maintenance work required above or behind access door and slowly close door until it is secured in place.
6. Complete applicable steps on Level 1 checklist to complete work.

S11 . Level 2

Accessing through an ACM finished surface.

Example Level 2: A. Open access door in acoustical plaster ceiling where ACM is in fair condition and may be disturbed.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Sponge
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Using sponge or sprayer, wet any ACM on access door flanges that may be disturbed and allow water to soak in for several minutes.
6. Unlatch door and open door 1/4" to 1/2" [6mm to 13mm]. HEPA vacuum around edges of door. Slowly open door and HEPA vacuum any debris on door or any ACM disturbed while opening door.
7. Perform maintenance work required above or behind access door and then slowly close door until it is secured in place.
8. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

S11 . Level 3

Accessing through an ACM finished.

Examples Level 3:

A. Open access door that has surfacing material on flanges that will be disturbed when door is opened.

B. Open access door in acoustical plaster or fireproofed surface where ACM is in poor condition or ACM debris may be present on back side of door.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate this work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices S1, M11, M13 or M25.**

Work Practice

1. Perform pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Sponge
   - Small stiff-bladed scraper
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Enter enclosure and use sponge or sprayer to wet any ACM on access door flanges that may be disturbed. Allow water to soak in for several minutes.
6. If door has not been previously opened, cut around perimeter of door using utility knife and operating HEPA vacuum within several inches of cutting area.
7. Adequately wet any loose ACM on door edges and frame, remove using scraper, and place ACM and debris into ACM disposal bags.
8. Perform maintenance work required above or behind access door.
9. Slowly close door until it is secured in place.
10. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

S12 . Summary

Painting surfacing ACM.

Summary This work practice describes the work required to paint small amounts of surfacing ACM, such as acoustical plaster or a decorative texture finish. Paint coats should be as thin as possible to prevent delamination of surfacing that may be caused by painting. This work may need to be treated as abatement work depending upon the type and condition of the surfacing.

Depending upon the type, condition and friability of the ACM, this work may need to be treated as an abatement activity instead of O & M work.

Examples

Level 1:	A.	Repaint previously painted asbestos-containing acoustical plaster in good condition. No preparation of the surface is required.
Level 2:	A.	Paint asbestos-containing decorative texture finish that has not been previously painted.
Level 3:	A.	Paint asbestos-containing acoustical plaster that has not been previously painted.
	B.	Paint asbestos-containing fireproofing.

Related Work Practices

S10 - Repair damaged surfacing ACM.

Worker Recommendations

One worker for Level 1 and Level 2. Two workers for Level 3. A person with air monitoring training might be required. This person can be the worker.

S12 . Level 1

Painting surfacing ACM.

Example Level 1: A. Repaint previously painted asbestos-containing acoustical plaster in good condition. No preparation of the surface is required.

Notes This work practice must be used in conjunction with General Procedure **W1, W9** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Paint, rollers or low pressure airless sprayer, and other painting equipment.
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed on drop cloth.
5. Paint ceiling using sprayer or rollers. If rollers are used, try to contact each area of the ceiling only once to avoid damage to ACM.
6. When painting is completed, clean up any loose debris using wet wiping and/or HEPA vacuuming, and roll up drop cloth. Dispose of paint rollers as ACM.
7. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

S12 . Level 2

Painting surfacing ACM.

Example Level 2: A. Paint asbestos-containing decorative texture finish that has not been previously painted.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Paint, rollers or low pressure airless sprayer, and other painting equipment.
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Paint ceiling using sprayer or rollers. If rollers are used, try to contact each area of the ceiling only once to avoid damage to ACM.
6. When painting is completed, clean up any loose debris using wet-wiping and/or HEPA vacuuming and roll up drop cloth. Dispose of paint rollers as ACM.
7. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

S12 . Level 3

Painting surfacing ACM.

Examples Level 3:

A. Paint asbestos-containing acoustical plaster that has not been previously painted.

B. Paint asbestos-containing fireproofing.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate this work with proper O & M work practice for accessing type of ceiling present in work area. **See Work Practices M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Paint, and rollers or low pressure airless sprayer, and other painting equipment.
3. Prepare work area with drop cloth, erect mini-enclosure (or enclose entire room) and set up negative pressure system. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure.
5. Enter enclosure and paint ceiling as follows:
   A. For acoustical plaster, use rollers or sprayer. If rollers are used, try to contact each area of the ceiling only once to avoid damage to ACM.
   B. For fireproofing, use airless sprayer only.
6. When painting is completed, wet drop cloth with amended water, roll up and dispose of as ACM. Use HEPA vacuum and/or wet-wiping to clean up any dust or debris under drop cloth. Dispose of rollers as ACM.
7. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

S13 . Summary

Accessing a contaminated light fixture.

Summary This work practice covers procedures for accessing into a contaminated light fixture. The fixture might be attached to or in a surface finished with ACM, or be installed below surfacing ACM. Light fixtures attached to or in surfaces finished with ACM can cause damage to ACM if the fixtures are moved during maintenance work.

Examples

Level 2:

A. Replace bulbs in recessed fixtures where ACM surfacing material debris is visible inside fixture.

B. Replace bulbs in pendant mount fixture where ACM debris is present inside or on top of fixture.

Level 3:

A. Replace bulbs in fixtures where surfacing ACM will be disturbed.

B. Replace bulbs in fixtures recessed in acoustical plaster ceiling located in a high ceiling public space.

Related Work Practices

S5 - Attach item to ceiling finished with ACM.
S8 - Replace bulbs in light fixture attached to or in surface finished with ACM.
S10 - Repair damaged surfacing ACM.

Worker Recommendations

One worker is usually sufficient. Two or more workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

S13 . Level 2

Accessing a contaminated light fixture.

Examples Level 2:

A. Replace bulbs in recessed fixtures where ACM surfacing material debris is visible inside fixture.

B. Replace bulbs in pendant mount fixture where ACM debris is present inside or on top of fixture.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Replacement Bulbs
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed on drop cloth.
5. Wet wipe exposed surfaces of fixture.
6. Carefully replace light bulbs without jarring fixture. Clean up any dust or debris generated using HEPA vacuum.
7. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

S13 . Level 3

Accessing a contaminated light fixture.

Examples Level 3:

A. Replace bulbs in recessed fixtures where surfacing ACM will be disturbed.

B. Replace bulbs in fixtures recessed in acoustical plaster ceiling located in a high ceiling public space.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Replacement bulbs
3. Prepare work area with drop cloth and set up HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into work area.
5. Wet wipe the exposed surfaces of the fixture.
6. With HEPA filtered local exhaust ventilation operating, carefully replace light bulbs without jarring fixture. Clean up any dust or debris generated using HEPA vacuum and/or wet wiping.
7. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

Section V. Thermal Systems Insulation (TSI) Work Practices

Delete work practices that have been deemed not applicable to this report according to specific conditions in the facility. This may mean deleting only parts of the section or could require deletion of whole sections.

Example:

T10 2 3 Clean up asbestos-containing debris in crawlspace or tunnel . . . . . NOT APPLICABLE

Read all work practices carefully and revise accordingly.

When information is deleted in one section, make certain it is deleted through-out the manual and any other practices.

Also, edit page numbering to reflect these changes, if applicable. DO NOT renumber any procedures or practices.

Work Practices Location Illustration 3

Code	Levels	Description	
T1	2 3	Remove asbestos-containing insulation on exposed pipe for maintenance work	4
T2	2 3	Remove asbestos-containing insulation on pipe above ceiling for maintenance work	7
T3	2 3	Remove asbestos-containing insulation on exposed pipe in elevated location for maintenance work	10
T4	3	Remove asbestos-containing insulation on pipe in occupied area for maintenance work	13
T5	2 3	Repair damaged asbestos-containing insulation on a pipe	15
T6	2 3	Repair damaged asbestos-containing insulation on a boiler, duct or flue	19
T7	2 3	Install device in or access surface of asbestos-containing insulation on a pipe, boiler, duct or flue	23
T8	2 3	Remove asbestos-containing duct insulation above ceiling for maintenance work	27
T9	2 3	Remove asbestos-containing insulation inside HVAC unit for maintenance work	30
T10	2 3	Clean up asbestos-containing debris in crawlspace or tunnel	33

The accompanying diagram illustrates typical applications of these work practices.

The following general notes should be reviewed by users of the TSI work practices:

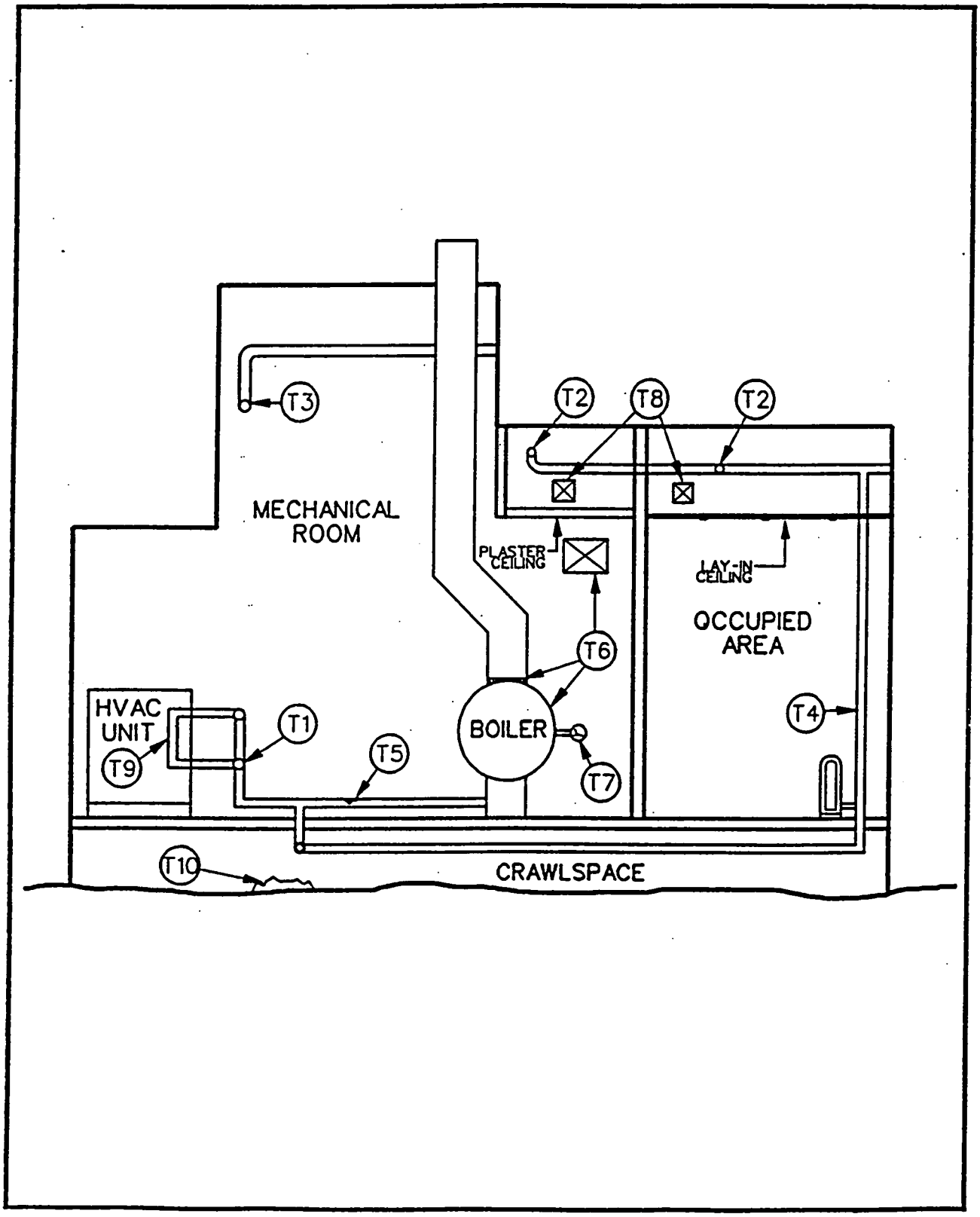
1. Users should review General Procedure W17 (glovebag removal procedures) and be properly trained in the use of glovebags. Glovebags are used in most of the TSI work practices. Glovebags used should be the appropriate type for the size of the task, orientation of piping (or other materials), temperature of surface and other relevant factors. Other types of prefabricated contaminant devices that may be used in place of glovebags are briefly discussed in W17.
2. Materials that have had TSI removed should be sprayed with a lockdown encapsulant in accordance with General Procedure W11.
3. Many of the TSI work practices recommend the use of two workers. Safety considerations for many activities, as well as efficiency considerations will often necessitate the use of two workers. Two workers are recommended for work practices using mini-enclosures. The O & M program may also require that two workers be used for glovebag removal work.
4. General Procedure APM10 discusses emergency work and/or dry removal that might be necessary under certain conditions, such as removing insulation adjacent to an activated power panel to make emergency repairs on a critical piece of equipment. Review and comply with all applicable regulatory requirements.
5. Some of the TSI Work Practices specify attaching a glovebag over duct tape applied around a pipe. If the pipe insulation surface is smooth, a flexible metal sleeve might be wrapped around the pipe in lieu of duct tape if an adequate seal can be obtained. This allows removal of the metal sleeve at the end of the work rather than leaving duct tape in place around the pipe (duct tape is recommended to be left in place because removal of duct tape can damage ACM insulation).
6. Careful work practices should be the primary means used to prevent releases of asbestos fibers during O&M work. Such practices include control measures such as wetting and local exhaust that control or collect fibers at the source. The goal of all asbestos O&M work should be to prevent any exposure of the worker and unnecessary contamination of the work area, drop cloths, mini-enclosures and other secondary control devices. Mini-enclosures should never be used to excuse sloppy work or creation of "bigger" messes.

Figure 8

The following illustration of O&M work practices for thermal systems insulation materials is an excellent reference document in determining relevant practices for your specific building. As stated elsewhere in this manual, if any work practice is deleted, do not renumber the remaining list; just note "not applicable". Such a foot note could also be made to the following illustration.

This illustration is not on diskette. However a copy of Figure 8 is provided in the front pouch of this notebook for your use. A copy of this sheet will need to be sent through the printer to add the title and footer which is found on the first page of the TSI.wpf file.

Figure 8:
Thermal Systems Insulation Location Illustration



Work Practices (for EPA Standard Methods)

As particular building conditions warrant, the following work practices of the EPA Standard Methods should be modified. Modifications maybe as great as deleting the entire section because thermal systems insulation type materials are not present in the building. It may be only necessary to delete a particular practice, or to add or delete a recommended level for the practice. One suggested modification is to revise or add examples that are specific to the facility to better orient O&M workers to the building's O&M program.

Modifications are encouraged as a means of tailoring this master guidance document to your specific facility.

Modifications to "Related Work Practices" and "Worker Recommendations" of the NIBS document may also be necessary.

T1 . Summary

Remove asbestos-containing insulation on exposed pipe for maintenance work.

Summary This work practice covers the procedures for removing small amounts of asbestos-containing insulation on an exposed pipe in an unoccupied area such as a boiler or mechanical room. The procedure assumes that the pipe insulation is accessible from a ladder or scaffold less than 10 feet (3 m) in height.

Examples

Level 2:

A. Removal of 1 standard glovebag of insulation in good condition to make a new connection to an existing pipe.

B. Removal of insulation in good condition to replace a valve.

Level 3:

A. Removal of pipe insulation in poor condition, or metal or waterproofed jacketed insulation.

B. Removal of pipe insulation that will not fit in a glovebag, or removal work on hot piping (>120°).

C. Work on hot piping may be reduced to Level 2 with the use of specialized or high-temperature glovebags or chambers.

Related Work Practices

T2 - Remove asbestos-containing insulation on pipe above panel ceiling for maintenance work

T3 - Remove asbestos-containing insulation on exposed pipe in elevated location for maintenance work

T4 - Remove asbestos-containing insulation on pipe in occupied area for maintenance work

T5 - Repair damaged system insulation on a pipe

T7 - Install device in asbestos-containing insulation on a or excess surface of, pipe, boiler, duct or flue

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Worker Recommendations

Two workers. A person with air monitoring training might be required. This person can be a worker.

T1 . Level 2

Remove asbestos-containing insulation on exposed pipe for maintenance work.

Examples Level 2:

A. Removal of 1 standard glovebag of insulation in good condition to make a new connection to an existing pipe.

B. Removal of insulation in good condition to replace a valve.

Notes This work practice must be used in conjunction with General Procedures **W1, W9, W17** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see general procedure W1 for standard tools, equipment and materials list).
   - Glovebags
   - Replacement non-ACM insulation if required
   - Pipe repair materials and tools
3. Prepare work area with drop cloth. See general procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Place all needed tools inside of glovebag and attach glovebag to area of pipe insulation to be removed. See general procedure W17.
6. Remove ACM using glovebag procedures. Adequately wet removal area frequently during removal of the bulk material. Seal exposed ends of insulation before removing glovebags.
7. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

T1 . Level 3

Remove asbestos-containing insulation on exposed pipe for maintenance work.

Examples Level 3:

A. Removal of pipe insulation in poor condition, or metal or waterproofed jacketed insulation.

B. Removal of pipe insulation that will not fit in a glovebag, or removal work on hot piping (>120°).

C. Work on hot piping may be reduced to Level 2 with the use of specialized or high-temperature glovebags or chambers.

Notes This work practice must be used in conjunction with General Procedures **W1, W9, W17** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See general procedure W1 for standard tools, equipment and materials list).
   - Glovebags
   - Replacement non-ACM insulation, if required
   - Pipe repair materials and tools
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system. See general procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Enter enclosure and place all needed tools inside of glovebag, (if pipe will fit in a glovebag) and attach glovebag to area of pipe insulation to be removed. Remove ACM using glovebag procedures. See general procedure W17. If pipe is hot or will not fit in a glovebag, set up HEPA filtered local exhaust ventilation and follow glovebag removal sequence inside of mini-enclosure.
6. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

T2 . Summary

Remove asbestos-containing insulation on pipe above ceiling for maintenance work.

Summary This work practice covers the procedures for removing small amounts of asbestos-containing insulation on a pipe located above a lay-in panel ceiling.

Examples

Level 2:

A. Remove pipe insulation above lay-in panel ceiling where insulation is in good condition, e.g., pipe leak.
B. Repair pipe leak above a non-ACM plaster or drywall ceiling.
C. Attach branch line to existing steam line above non-ACM plaster ceiling.

Level 3:

A. Remove section of pipe insulation in poor condition for fitting replacement.
B. Remove section of pipe insulation in poor condition, or with metal jacket, or waterproofed to replace a section of pipe.
C. Remove ACM insulation which is damaged and in poor condition from steam line above non-ACM plaster ceiling.
D. Remove insulation in poor condition on a pipe to repair leak above a non-ACM drywall ceiling.

Related Work Practices

S2 - Observation or work in ceiling plenum space where exposed surfacing ACM is present
T3 - Remove asbestos-containing insulation on exposed pipe in elevated location for maintenance work
M11 - Replace asbestos-containing ceiling panels in lay-in ceiling system.
M12 - Replace asbestos containing ceiling tiles attached with adhesive
M13 - Replace asbestos containing ceiling tiles in spline ceiling system
M29 - Clean up debris from minor fiber release

Worker Recommendations

Two workers. A person with air monitoring training might be required. This person can be a worker.

T2 . Level 2

Remove asbestos-containing insulation on pipe above lay-in panel ceiling for maintenance work.

Example Level 2: A. Remove pipe insulation above lay-in panel ceiling where insulation is in good condition, e.g., pipe leak.

Notes This work practice must be used in conjunction with General Procedures **W1, W9, W17** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. See Work Practice **M11, M13, or 1**

M25.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see general procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Replacement non-ACM insulation if required
   - Pipe repair materials and tools
   - Glovebags
3. Prepare work area with drop cloth. See general procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Obtain access above ceiling using O & M work practice selected (see note above step 1).
6. Pick up any bulk debris within reach on top of ceiling and place into disposal bag. HEPA vacuum top side of ceiling within reach from access hole.
7. Place all tools needed inside glovebag and attach glovebag to area where pipe insulation will be removed. See general procedure W17.
8. Remove ACM using glovebag procedures. Adequately wet removal area frequently during removal of the bulk material.
9. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

T2 . Level 3

Remove asbestos-containing insulation on pipe above lay-in panel ceiling for maintenance.

Examples Level 3:

A. Remove section of pipe insulation in poor condition for fitting replacement.

B. Remove section of pipe insulation in poor condition, or with metal jacket, or waterproofed to replace a section of pipe.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and **W17** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

*Note: Coordinate this work with proper O & M work practice for accessing type of ceiling present in work area. See Work Practice **M11, M13, M25.***

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See general procedure W1 for standard tools, equipment and materials list).
   - Tools and Equipment:
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Replacement non-ACM insulation if required
   - Pipe repair materials and tools
   - Glovebags
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system. See general procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Enter enclosure and obtain access above ceiling using O & M work practice selected (see note above step 1.)
6. Pick up any bulk debris within reach on top of ceiling and place into disposal bag.
7. HEPA vacuum top side of ceiling within reach from access hole.
8. If present, remove any metal jacket material over insulation to be removed.
9. Place all tools needed inside glovebag and attach glovebag to area of pipe insulation to be removed. See general procedure W17.
10. Remove ACM using glovebag procedures. Adequately wet removal area frequently during removal of the bulk material.
11. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

T3 . Summary

Remove asbestos-containing insulation on exposed pipe in elevated location for maintenance work.

Summary

This work practice covers the procedures for removing small amounts of asbestos-containing insulation on exposed piping in elevated locations (approximately 10 feet [3 m] or more above floor level). This procedure uses a scaffold as a work platform to reduce the safety hazards from working from a tall ladder.

Examples

Level 2:

A. Repair small pipe leak in boiler room
B. Install new ceiling mounted hot water heating unit in warehouse space fed from existing piping.

Level 3:

A. Remove insulation on 12" (305 mm) fitting in poor condition, 15 feet (4.5 m) above floor level to repair leak in steam line.
B. Remove insulation on pipe adjacent to steel grate catwalk 30 feet (9 m) above floor in boiler room.
C. Work practice may be Level 2 if fitted or specialty glovebags are used.

Related Work Practices

T2 - Remove asbestos-containing insulation on pipe above panel ceiling for maintenance work

T4 - Remove asbestos-containing insulation on pipe in occupied area for maintenance work

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Worker Recommendations

Two workers. A person with air monitoring training might be required. This person can be a worker.

T3 . Level 2

Remove asbestos-containing insulation on exposed pipe in elevated location for maintenance work.

Examples Level 2:

A. Repair small pipe leak in boiler room

B. Install new ceiling mounted hot water heating unit in warehouse space fed from existing piping.

Notes This work practice must be used in conjunction with General Procedures **W1, W9, W17** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see general procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Replacement non-ACM insulation if required
   - Pipe repair materials and tools
   - Glovebags
   - Non-slip drop cloth
3. Prepare work area with drop cloth. See general procedure W9. Erect scaffold system using proper OSHA procedures. Care should be taken not to disturb the ACM.
4. Place tools, equipment and materials needed onto non-slip drop cloth on scaffold system.
5. Place all tools needed inside glovebag and attach glovebag to area where pipe insulation will be removed. See general procedure W17.
6. Remove ACM using glovebag procedures. Adequately wet removal area frequently during removal of the bulk material.
7. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

T3 . Level 3

Remove asbestos-containing insulation on exposed pipe in elevated location for maintenance work.

Examples Level 3:

A. Remove insulation on 12" (305 mm) fitting in poor condition, 15 feet (4.5 m) above floor level to repair leak in steam line.

B. Remove insulation on pipe adjacent to steel grate catwalk 30 feet (9 m) above floor in boiler room.

C. Work practice may be reduced to Level 2 if fitted or specialty glovebags are used.

Notes This work practice must be used in conjunction with General Procedures **W1, W9, W17** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See general procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Replacement non-ACM insulation if required
   - Pipe repair materials and tools
   - Glovebags
   - Non-slip drop cloth
3. Prepare work area with drop cloth. Erect scaffold system using proper OSHA procedures. Care should be taken not to disturb the ACM. Erect mini-enclosure on top of scaffold system and set up negative pressure system. See general procedure W9. The top floor layer in enclosure should be a non-slip drop cloth material.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Enter enclosure, place all tools needed inside glovebag and attach glovebag to area where pipe insulation will be removed. See general procedure W17.
6. Remove ACM using glovebag procedures. Adequately wet removal area frequently during removal of the bulk material.
7. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

T4 . Summary

Remove asbestos-containing insulation on pipe in occupied area for maintenance work.

Summary This work practice covers the procedures for removing small amounts of asbestos-containing pipe insulation inside a mini-enclosure located in an occupied area. This procedure assumes that maintenance work must occur immediately in an occupied area or work area is occupied 24 hours a day.

Examples Level 3:

A. Repair leak in pipe riser of occupied computer room.
B. Replace damaged insulation on piping in manufacturing plant during working hours.

Related Work Practices

T2 - Remove asbestos-containing insulation on pipe above ceiling for maintenance work
T3 - Remove asbestos-containing insulation on exposed pipe in elevated location for maintenance work

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Worker Recommendations

Two workers. A person with air monitoring training might be required. This person can be a worker.

T4 . Level 3

Remove asbestos-containing insulation on pipe in occupied area for maintenance work.

Examples Level 3:

A. Repair leak in pipe riser of occupied computer room.
B. Replace damaged insulation on piping in manufacturing plant during working hours.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9, W17** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

If access above ceiling is needed, coordinate this work with proper O&M work practice for accessing type of ceiling present in work area. See Work Practices M11, M13 or M25.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See general procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Replacement non-ACM insulation if required
   - Pipe repair materials and tools
   - Glovebags
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system. See general procedure W9.
4. Place tools, equipment and materials needed into enclosure. If work must occur above ceiling, include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Enter enclosure and place all tools needed inside glovebag. If access above ceiling is required, obtain access above ceiling using O & M work practice selected (see note above step 1). Attach glovebag to area where pipe insulation will be removed. See general procedure W17.
6. Remove ACM using glovebag procedures. Adequately wet removal area frequently during removal of the bulk material.
7. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

T5 . Summary

Repair damaged asbestos-containing insulation on a pipe.

Summary This work practice covers the procedures for repairing small areas of damaged asbestos-containing insulation.

Examples

Level 2:
- A. Repair small area of impact damage on pipe insulation in good condition.
- B. Repair minor damage to insulation on a pipe fitting.

Level 3:
- A. Repair damaged pipe insulation adjacent to operating HVAC.
- B. Repair delaminated pipe insulation in an occupied area.

Related Work Practices

T3 - Remove asbestos-containing insulation on exposed pipe in elevated location for maintenance work

M29 - Clean up debris from minor fiber release

Worker Recommendations

One worker - Level 2. Two workers - Level 3. A person with air monitoring training might be required. This person can be a worker.

T5 . Level 2

Repair damaged asbestos-containing insulation on a pipe.

Examples

Level 2:

A. Repair small area of impact damage on pipe insulation in good condition.

B. Repair minor damage to insulation on a pipe fitting.

Notes

This work practice must be used in conjunction with General Procedures **W1 and W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

If access above ceiling is needed, coordinate work with proper O & M work practice for accessing type of ceiling present in work area. See Work Practices **M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see general procedure W1 for standard tools, equipment and materials list).
   - Sponge
   - Non-ACM insulation patching material
   - Putty Knife
   - Lag cloth
3. Prepare work area with drop cloth. See general procedure W9.
4. Place tools, equipment and materials needed onto drop cloth. If access above ceiling is required, obtain access above ceiling using O & M work practice selected (see note above step 1).
5. Adequately wet area of insulation to be repaired where appropriate. HEPA vacuum damaged area to be repaired and any loose debris.
6. Fill in repair area with non-ACM patching material. Dip lag cloth into water and squeeze out excess water. Apply lag cloth to area of insulation being repaired and smooth out using a wet sponge.
7. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

T5 . Level 3

Repair damaged asbestos-containing insulation on a pipe.

Examples

Level 3:

A. Repair damaged pipe insulation adjacent to operating HVAC.

B. Repair delaminated pipe insulation in an occupied area.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9, W17** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

If access above ceiling is needed, coordinate this work with proper O & M work practice for accessing type of ceiling present in work area. See Work Practices **M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See general procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Sponge
   - Non-ACM Insulation patching material
   - Putty Knife
   - Lag cloth
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system. See general procedure W9.
4. Place tools, equipment and materials needed into enclosure. If work must occur above ceiling, include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Enter enclosure. If access above ceiling is required, obtain access above ceiling using O & M work practice selected (see note above step 1).
6. If work can be done with a glovebag method, follow procedures below:
   - A. Install duct tape around area to be repaired.
   - B. Place tools, equipment and other materials into glove bag. Attach glovebag to duct tape using more duct tape.
   - C. Remove all loose or damaged insulation using glovebag procedures. See general procedure W17.
   - D. Remove glovebag leaving duct tape from step 6b above.

7. If a glovebag method cannot be effectively utilized, follow procedures below:
   A. Adequately wet material at area to be repaired.
   B. Cut out damaged TSI, trimming edges so straight square clean edges remain. This procedure must only be performed on adequately wet material, and with a HEPA vacuum nozzle adjacent to the cutting tool so that any debris or fibers are captured by the HEPA vacuum.
8. Fill in repair area with non-ACM patching material. Dip lag cloth into water and squeeze out excess water. Apply lag cloth to area of insulation being repaired and smooth out using a wet sponge.
9. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

T6 . Summary

Repair damaged asbestos-containing insulation on a boiler, duct or flue.

Summary This work practice covers the procedures for repairing small amounts of damaged asbestos-containing thermal systems insulation. The procedures assume that the area to be repaired is within the OSHA short-scale/short-duration project limits.

Examples

Level 2:
- A. Repair small area of impact damaged insulation on duct or flue in good condition.
- B. Repair minor damage to boiler insulation around access hatch.

Level 3:
- A. Repair badly damaged flue or duct insulation.
- B. Repair area of water damaged insulation on hot water tank or boiler.

Related Work Practices

T3 - Remove asbestos-containing insulation on exposed pipe in elevated location for maintenance work

M29 - Clean up debris from minor fiber release

Worker Recommendations

One worker - Level 2. Two workers - Level 3. A person with air monitoring training might be required. This person can be a worker.

T6 . Level 2

Repair damaged asbestos-containing insulation on a boiler, duct or flue.

Examples Level 2:

A. Repair small area of impact damaged insulation on duct or flue in good condition.

B. Repair minor damage to boiler insulation around access hatch.

Notes This work practice must be used in conjunction with General Procedures **W1 and W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.
If access above ceiling is needed, coordinate work with proper O & M work practice for accessing type of ceiling present in work area. See Work Practices M11, M13 or M25.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see general procedure W1 for standard tools, equipment and materials list).
   - Sponge
   - Non-ACM insulation patching material
   - Putty Knife
   - Lag cloth
3. Prepare work area with drop cloth. See general procedure W9.
4. Place tools, equipment and materials needed onto drop cloth. If access above ceiling is required, obtain access above ceiling using O & M work practice selected (see note above step 1).
5. Adequately wet area of insulation to be repaired where appropriate. HEPA vacuum damaged area to be repaired and any loose debris.
6. Fill in repair area with non-ACM patching material.
7. Dip lag cloth into water and squeeze out excess water. Apply lag cloth to area of insulation being repaired and smooth out using a wet sponge.
8. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

T6 . Level 3

Repair damaged asbestos-containing insulation on a boiler, duct or flue.

Examples Level 3:

A. Repair badly damaged flue or duct insulation.
B. Repair area of water damaged insulation on hot water tank or boiler.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9, and W17** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

If access above ceiling is needed, coordinate this work with proper O & M work practice for accessing type of ceiling present in work area. See Work Practices M11, M13 or M25.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See general procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Sponge
   - HEPA vacuum, hose and attachments
   - Putty Knife
   - Glovebags
   - Lag cloth
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system. See general procedure W9.
4. Place tools, equipment and materials needed into enclosure. If work must occur above ceiling, include a HEPA vacuum inside enclosure for vacuuming areas above ceiling.
5. Enter enclosure. If access above ceiling is required, obtain access above ceiling using O & M work practice selected (see note above step 1).
6. If work can be done with a glovebag method, follow procedures below:
   A. Install duct tape around area to be repaired.
   B. Place tools, equipment and other materials into glove bag. Attach glovebag to duct tape using more duct tape.
   C. Remove all loose or damaged insulation using glovebag procedures. See general procedure W17.
   D. Remove glovebag leaving duct tape from step 6b above.

7. If a glovebag method cannot be effectively utilized, follow procedures below:
   A. Adequately wet material at area to be repaired.
   B. Cut out damaged TSI, trimming edges so straight square clean edges remain. This procedure must only be performed on adequately wet material, and with a HEPA vacuum nozzle adjacent to the cutting tool so that any debris or fibers are captured by the HEPA vacuum.
   C. Place ACM debris into disposal bags.
8. Remove glovebag and fill in repair area with non-ACM patching material.
9. Dip lag cloth into water and squeeze out excess water. Apply lag cloth to area of insulation being repaired and smooth out using a wet sponge.
10. Perform clean-up and tear-down steps on Level 3 checklist to complete work. Leave duct tape installed in step 6 in place.

T7 . Summary

Install device in, or access surface of, asbestos-containing insulation on a pipe, boiler, duct or flue.

Summary This summary covers the removal of small amounts of ACM as required to install a device (such as a temperature sensor or damper control) in, or simply to access, the surface of an ACM insulated pipe, boiler, duct or flue.

Examples

Level 2:
- A. Remove ACM in good condition in order to install energy management system sensors and controls.

Level 3:
- A. Drill through insulation using power tools to attach heat sensor directly on metal flue.
- B. Remove damaged insulation in order to attach heat sensor directly on metal flue.

Related Work Practices

T1 - Remove Asbestos-containing insulation on exposed pipe for maintenance work
T4 - Remove Asbestos-containing insulation on pipe in occupied area for maintenance work
T5 - Repair damaged asbestos-containing insulation on a pipe

Worker Recommendations

One worker. A person with air monitoring training might be required. This person can be the worker.

T7 . Level 2

Install device in, or access surface of, asbestos-containing insulation on a pipe, insulated boiler, duct or flue.

Example Level 2: A. Remove ACM in good condition in order to install energy management system sensors and controls.

Notes This work practice must be used in conjunction with General Procedures **W1, W9, and W17** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

If access above ceiling is needed, coordinate work with proper O & M work practice for accessing type of ceiling present in work area. See Work Practices **M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see general procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Hand drill and drill bits or hole saw
   - Non-ACM replacement insulation or patching material (if required)
   - Device to be installed and related tools
   - Glovebags
3. Prepare work area with drop cloth. See general procedure W9.
4. Place tools, equipment and materials needed onto drop cloth. If access above ceiling is required, obtain access using O & M work practice selected (See note above step 1).
5. Attach duct tape around area where device will be installed.
6. Place tools needed into glovebag and attach glovebag to duct tape.
7. Remove or penetrate ACM as required using glovebag procedures. See general procedure W17. Adequately wet removal area frequently during removal of the bulk material.
8. Install device or perform maintenance. Perform clean-up and tear-down steps on Level 2 checklist to complete work. Leave duct tape installed in step 5 in-place.

T7 . Level 3

Install device in, or access surface of, asbestos-containing insulation on a pipe, boiler, duct or flue.

Examples Level 3:

A. Drill through insulation using power tools to attach heat sensor directly on metal flue.

B. Remove damaged insulation in order to attach heat sensor directly on metal flue.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9, and W17** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

If access above ceiling is needed, coordinate this work with proper O & M work practice for accessing type of ceiling present in work area. See Work Practices **M11, M13 or M25.**

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See general procedure W1 for standard tools, equipment and materials list).
   - Scraper (1" [25 mm] wide blade)
   - Stiff nylon bristle brushes
   - Wire cutters
   - Power drill with HEPA attachment
   - Hole saw or drill bits
   - Glovebags
   - Non-ACM replacement insulation or patching material (if required)
   - Device to be installed and related tools
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system. See general procedure W9.
4. Place tools, equipment and materials needed into enclosure. If work must occur above ceiling, include a HEPA vacuum inside enclosure for use during the work.
5. Enter enclosure. If access above ceiling is required, obtain access above ceiling using O & M work practice selected (see note above step 1).
6. If work can be done with a glovebag method, follow procedures below:
   - A. Install duct tape around area to be penetrated or removed.
   - B. Place tools, equipment and other materials into glove bag. Attach glovebag to duct tape using more duct tape.
   - C. Remove all loose or damaged insulation using glovebag procedures. See general procedure W17.
   - D. Remove glovebag leaving duct tape from step 6b above.

7. If a glovebag method cannot be effectively utilized, follow procedures below:
   A. Adequately wet material at area to be penetrated or removed.
   B. Carefully remove or penetrate ACM. This procedure must only be performed on adequately wet material, and with a HEPA vacuum nozzle adjacent to the removal or penetrating tool so that any debris or fibers are captured by the HEPA vacuum.
8. Install device and perform clean-up and tear-down steps on Level 3 checklist to complete work. Leave duct tape installed in step 6 in place.

T8 . Summary

Remove asbestos-containing duct insulation above ceiling for maintenance work.

Summary This work practice describes the procedures for removing small amounts of asbestos-containing duct insulation above a ceiling. Ceiling might be ACM or non-ACM. Ceiling might be plaster, drywall or lay-in.

Examples

Level 2:

A. Remove small amount of damaged insulation around damper control to permit insulation repair.

B. Replace Variable Air Volume (VAV) box on ACM insulated duct.

Level 3:

A. Remove damaged duct insulation so that new branch lines can be tied to existing duct system for sub-divided office space.

B. Remove delaminating duct insulation above lay-in ceiling.

C. Remove delaminating duct insulation above plaster or drywall ceiling.

Related Work Practices

T6 - Repair damaged asbestos-containing insulation on a boiler, duct or flue
M25 - Remove section of asbestos-containing drywall or plaster.

Worker Recommendations

Two workers. A person with air monitoring training might be required. This person can be a worker.

T8. Level 2

Remove asbestos-containing duct insulation above ceiling for maintenance work.

Examples Level 2:

A. Remove small amount of damaged insulation around damper control to permit insulation repair.

B. Replace Variable Air Volume (VAV) box on ACM insulated duct.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9, and W17** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. See work practices **M11, M12, M13 and M25.**

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see general procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Non-acm replacement duct insulation
   - Glovebags
3. Prepare work area with drop cloth. See general procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Obtain access above ceiling using O & M work practice selected (see note above step 1).
6. Pick up any bulk debris within reach on top of ceiling and place into disposal bag.
7. HEPA vacuum top side of ceiling within reach from access hole.
8. Install duct tape around area to be removed.
9. Place all tools needed inside glovebag and attach glovebag to duct tape around area of duct insulation to be removed.
10. Remove ACM using glovebag procedures. See general procedure W17. Adequately wet removal area frequently during removal of bulk material.
11. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist and ceiling access work practice to complete work. Leave duct tape installed in step 9 in place.

T8 . Level 3

Remove asbestos-containing duct insulation above ceiling for maintenance work.

Examples Level 3:

A. Remove damaged duct insulation so that new branch lines can be tied to existing duct system for sub-divided office space.

B. Remove delaminating duct insulation above lay-in ceiling.

C. Remove delaminating duct insulation above plaster or dyrwall ceiling.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9, and W17** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. See work practices **M11, M12, M13 and M25.**

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See general procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Non-ACM replacement duct insulation
   - Glovebags, size and configuration as required
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system. See general procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for use during the work.
5. Obtain access above ceiling using O & M work practices selected (see note above step 1).
6. Pick up bulk debris within reach on top of ceiling and place into disposal bag.
7. HEPA vacuum top side of ceiling within reach from access hole.
8. Install duct tape around area to be removed.
9. Place all tools needed inside glovebag and attach glovebag to duct tape around area of duct insulation to be removed.
10. Remove ACM using glovebag procedures. See general procedures W17. Adequately wet removal area frequently during removal of bulk material.
11. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist and ceiling access work practice to complete work. Leave duct tape installed in step 8 in place.

T9 . Summary

Remove asbestos-containing insulation inside HVAC unit for maintenance work.

Summary This work practice describes the procedures to be used to remove small amounts off asbestos-containing duct or pipe insulation inside an HVAC unit.

*Note: If a flexible connector must be removed, see Work Practice **M26.***

Examples

Level 2:	A.	Remove small amount of pipe insulation in good condition using glovebag procedures to replace cooling or heating coil.
Level 3:	A.	Remove ACM pipe insulation in poor condition inside HVAC unit.
	B.	Remove small amount of duct insulation as required to replace flexible connector.

Related Work Practices

T3 - Remove asbestos-containing insulation on exposed pipe in elevated location for maintenance work
T4 - Remove asbestos-containing insulation on pipe in occupied area for maintenance work
T5 - Repair damaged asbestos-containing insulation on a pipe
T6 - Repair damaged asbestos-containing insulation on a boiler, duct or flue
S6 - Remove asbestos-containing flexible duct connector

Worker Recommendations

Two workers. A person with air monitoring training might be required. This person can be a worker.

T9 . Level 2

Remove asbestos-containing insulation inside HVAC unit for maintenance work.

Example Level 2: A. Remove small amount of pipe insulation in good condition to replace cooling or heating coil.

Notes This work practice must be used in conjunction with General Procedures **W1, W9, and W17** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see general procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Non-ACM replacement insulation
   - Glovebags
3. Prepare work area with drop cloth. See general procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Install duct tape around insulation to be removed.
6. Place all tools needed inside of glovebag and attach glovebag to duct tape around area where insulation will be removed.
7. Remove ACM using glovebag procedures. See general procedure W17. Adequately wet removal area frequently during removal of bulk materials.
8. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work. Leave duct tape installed in step 5 in place.

T9 . Level 3

Remove asbestos-containing insulation inside HVAC unit for maintenance work.

Note: *If a flexible connector must be removed, see Work Practice M26.*

Examples Level 3:

A. Remove ACM pipe insulation in poor condition inside HVAC unit.

B. Remove duct insulation required to replace flexible connector.

Notes This work practice must be used in conjunction with General Procedures **W1, W9, and W17** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See general procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" [50-75 mm] wide stiff blade)
   - Stiff nylon bristle brushes
   - Non-ACM replacement duct insulation
   - Glovebags
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative-pressure system where feasible. See general procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure for use during the work.
5. If work can be done with a glovebag method, follow procedures below:
   - A. Enter enclosure and install duct tape around area to be removed.
   - B. Place tools, equipment and other materials into glove bag. Attach glovebag to duct tape using more duct tape.
   - C. Remove all loose or damaged insulation using glovebag procedures. See general procedure W17.
   - D. Remove glovebag leaving duct tape from step 5b above.
6. If a glovebag method cannot be effectively utilized, follow procedures below:
   - A. Install duct tape around insulation to be removed.
   - B. Adequately wet insulation to be removed.
   - C. Remove ACM while wetting removal area frequently with amended water. Keep hose of an operating HEPA vacuum adjacent to the removal area to capture any debris or fibers generated.
7. Perform clean-up and tear-down steps on Level 3 checklist to complete work. Leave duct tape installed in step 5 or 6 in place.

T10 . Summary

Clean up asbestos-containing debris in crawlspace or tunnel.

Summary This work practice describes the work required to clean up small amounts of asbestos-containing debris (below the small-scale, short-duration project limits) found in a crawlspace area or tunnel.

Examples

Level 2:
- A. Clean up several pieces of pipe insulation debris in crawlspace
- B. Clean up small amount of insulation debris in tunnel

Level 3:
- A. Clean up of ACM debris in a tunnel that is used as a plenum for the HVAC system.
- B. Clean-up of delaminated duct insulation or fallen pipe insulation in an area where maintenance work will be performed.

Related Work Practices

T1 - Remove asbestos-containing insulation on exposed pipe for maintenance work
T5 - Repair damaged asbestos-containing insulation on a pipe
T6 - Repair damaged asbestos-containing insulation on a boiler, duct or flue

Worker Recommendations

Two workers due to confined space safety concerns. A person with air monitoring training might be required. This person can be a worker.

T10 . Level 2

Clean up asbestos-containing debris in crawlspace or tunnel.

Examples

Level 2:

A. Clean up several pieces of pipe insulation debris in crawlspace

B. Clean up small amount of insulation debris in tunnel

Notes

This work practice must be used in conjunction with General Procedures **W1** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Review confined space requirements with APM before start of work. See general procedure APM 8.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. See general procedure W1 for standard tools, equipment and materials list.
3. Place tools, equipment and materials needed into work area. One worker should remain outside to communicate with inside worker and handle rescue arrangements, if needed.
4. Adequately wet floor area and debris in work area.
5. Starting near entry to area and working toward rear of area, pick up pieces of debris and place into disposal bags.
6. Adequately wet areas where debris was removed. Use HEPA vacuum to remove any remaining debris. Place debris into disposal bags. HEPA vacuum floor after gross debris is removed.
7. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

T10 . Level 3

Clean up asbestos-containing debris in crawlspace or tunnel.

Examples Level 3:

A. Clean up of ACM debris in a tunnel that is used as a plenum for the HVAC system.

B. Clean-up of delaminated duct insulation or fallen pipe insulation in an area where maintenance work will be performed.

Notes This work practice must be used in conjunction with General Procedures **W1 and W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Review confined space requirements with APM before start of work. See general procedure APM 8.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. See general procedure W1 for standard tools, equipment and materials list.
3. One worker should remain outside to communicate with inside worker and handle rescue arrangements if needed. Prepare work area with mini-enclosure (without floor) and set up negative pressure system and/or local exhaust ventilation. See general procedure W9.
4. Place tools, equipment and materials needed into enclosure. Include a HEPA vacuum inside enclosure.
5. Adequately wet floor area and debris inside enclosure.
6. Starting near entry to area and working toward rear of area, pick up pieces of debris and place into disposal bags.
7. Adequately wet areas where debris was removed. Use HEPA vacuum to remove any remaining debris. Place debris into disposal bags. HEPA vacuum floor after gross debris is removed.
8. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

Section VI. Miscellaneous Materials Work Practices

Delete work practices that have been deemed not applicable to this report according to specific conditions in the facility. This may mean deleting only parts of the section or could require deletion of whole sections.

Example:

M20 1 2 3 Remove asbestos-containing chalk board ..... NOT APPLICABLE

Read all work practices carefully and revise accordingly.

When information is deleted in one section, make certain it is deleted through-out the manual and any other practices.

Also, edit page numbering to reflect these changes, if applicable. DO NOT renumber any procedures or practices.

Work Practices Location Illustration 4

Code	Levels	Description	
M1	1 2 3	Replacement of resilient asbestos floor tiles	5
M2	1 2 3	Replacement of vinyl sheet flooring with ACM backing	11
M3	1 2 3	Penetrate resilient asbestos flooring and subfloor	18
M4	1	Install new resilient flooring or carpet over resilient asbestos flooring	22
M5	1 2	Install partition over resilient asbestos flooring	24
M6	1	Wet strip floor wax from resilient asbestos flooring	27
M7	1	Dry or spray buffing resilient asbestos flooring	29
M8	1	Cleaning resilient asbestos flooring	31
M9	1 2 3	Remove carpet over resilient asbestos flooring	33
M10	1 2	Clean potentially asbestos-contaminated carpet	38
M11	1 2 3	Remove asbestos-containing ceiling panels in lay-in ceiling system	41
M12	2 3	Remove asbestos-containing ceiling tiles attached with adhesive	45
M13	1 2 3	Remove asbestos-containing ceiling tiles in spline ceiling system	48
M14	2 3	Cut or drill asbestos cement panels	52
M15	1 2 3	Remove asbestos cement panels	55
M16	1 2	Remove asbestos cement cooling tower louvers	59
M17	1 2	Remove and replace asbestos cement roof shingles	62
M18	1 2	Remove and replace asbestos cement siding	65
M19	1 2 3	Remove high-temperature resistant (HTR) asbestos cement panels	68

M20	1 2 3	Remove asbestos-containing chalk board	72
M21	1 2 3	Remove asbestos-containing fire door and/or door hardware	76
M22	1 2	Remove asbestos-containing built-up roofing	80
M23	1 2	Remove asbestos-containing asphalt shingles	84
M24	2 3	Cut or drill asbestos-containing drywall, plaster or drywall compound	89
M25	2 3	Remove section of asbestos-containing drywall	93
M26	1 2 3	Remove asbestos-containing flexible duct connector	96
M27	1 2 3	Remove asbestos-containing ductwork taping cloth	100
M28	2	Remove contaminated filters in HVAC unit serving plenum space with exposed ACM	104
M29	1 2	Clean up debris from minor fiber release	106
M30	1 2 3	Replace asbestos-containing gaskets	109
M31	2 3	Emptying and changing filter in HEPA vacuum or changing filter in HEPA fan unit	113
M32	1 2 3	Remove asbestos-wrapped wiring	116
M33	1 2 3	Removing asbestos-containing caulking compound	120
M34	1	Clean room that has asbestos-containing dust	124

The accompanying diagram illustrates typical applications of the above work practices.

The following general notes should be reviewed by users of the miscellaneous ACM work practices:

1. Resilient floor tile and vinyl sheet are based on work practices developed by the resilient floor covering manufacturers (RFCM) for the removal of asbestos and non-asbestos-containing resilient floor covering materials. Work practice levels that incorporate the RFCM practices are noted as (RFCM Procedures).
   In accordance with terminology used by the RFCM, the term "vinyl" is used only to refer to sheet flooring. The term "resilient" is used to refer to both floor tile and sheet flooring, since many tile products contain resilient binder materials other than vinyl.

   The RFCM have submitted to OSHA airborne exposure data on removal of resilient floor tile, asphaltic cutback materials, and sheet vinyl flooring. OSHA has stated that it will accept the RFCM data for consideration as historical data to support a claim for an exemption from the need to conduct initial air monitoring under the OSHA regulation 29 CFR 1926.58(f)(2)(i). Historical data exemptions notwithstanding, if applicable OSHA exposure limits are exceeded other provisions and requirements of the OSHA asbestos regulation remain in full force and effect. In considering the initial air monitoring exemption claim, the local OSHA compliance officer determines whether the recommended work practices are being strictly followed, the work conditions at the job site are similar to those in the study, and OSHA's field data (if any) are below OSHA's action level and excursion limit. Resilient floor covering is classified by the EPA NESHAP as Category 1 non-friable ACM. If Category 1 ACM has become friable, or will become friable, or has been

subjected to sanding, grinding, cutting or abrading, it is defined as Regulated ACM by NESHAP. The user should consider the use of Levels 2 or 3 to perform O&M activities under such conditions. Information in the NIBS Asbestos Abatemen

Guide Specifications sections 02085 and 02087 discusses the removal of resilient floor covering.

2. Careful work practices should be the primary means used to prevent releases of asbestos fibers during O&M work. Such practices include control measures such as wetting and local exhaust that control or collect fibers at the source. The goal of all asbestos O&M work should be to prevent any exposure of the worker and unnecessary contamination of the work area, drop cloths, mini-enclosures and other secondary control devices. Mini-enclosures should never be used to excuse sloppy work or creation of "bigger" messes.

   The following dust suppression tools & techniques should be used where appropriate for work on miscellaneous ACM:

   A. A wet sponge can be used where small holes must be drilled in ACM. The sponge can be held over the location where the hole is needed and the hole can be drilled through the wet sponge. The sponge should help to keep any dust or debris wet.
   B. The hose of an operating HEPA vacuum can be placed near the cutting point of a drill bit or other tools.
   C. Shaving cream can be sprayed over an area where ACM will be cut or drilled to contain dust or debris. Any shaving cream used in this manner should be disposed of as ACM after use.
   D. Tools with HEPA filtered dust collection attachments.

3. Glovebag removal procedures as described in General Procedure W17 may be appropriate for use in certain small O&M tasks involving miscellaneous ACM, such as the removal of a small area of floor tile where an enclosure is desired, changing the bag in a HEPA vacuum or removing a small amount of ductwork taping cloth.

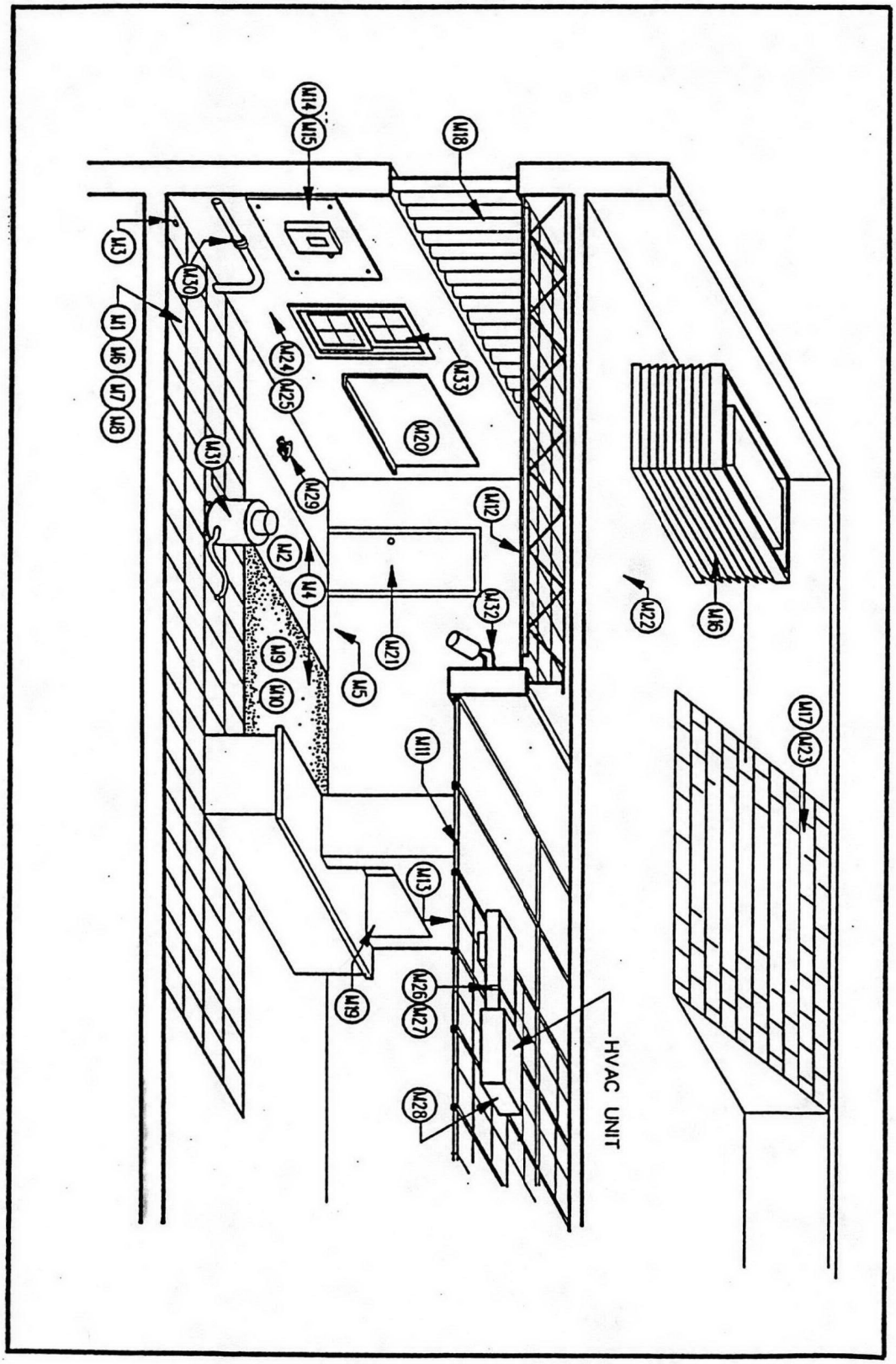
4. If the O&M activity involves work on materials (such as asbestos cement board) that might have chemical residue present, any residue should be properly removed prior to the start of the O&M work. Cleaning might be necessary to reduce the possibility of a chemical reaction that could be caused by water, surfactants and/or other substances mixing with chemical residues during O&M work.

Figure 9

The following illustration of O&M work practices for miscellaneous materials is an excellent reference document in determining relevant practices for your specific building. As stated elsewhere in this manual, if any work practice is deleted, do not renumber the remaining list; just note "not applicable". Such a footnote could also be made to the following illustration.

This illustration is not on diskette; however, a copy of Figure 9 is provided in the front pouch of this notebook for your use. A copy of this sheet will need to be fed through the printer to add the title and footer, which are found on the first page of the MISC1-8.WPF file.

Figure 9: Miscellaneous Materials Location Illustration



Work Practices (for EPA Standard Methods)

As particular building conditions warrant, the following work practices of EPA's Standard Methods should be modified. Modifications maybe as great as deleting the entire section because miscellaneous type materials are not present in the building. It may be only necessary to delete a particular practice, or to add or delete a recommended level for the practice. One suggested modification is to revise or add examples that are specific to the facility to better orient O&M workers to the building's O&M program.

Modifications are encouraged as a means of tailoring this master guidance document to your specific facility.

Modifications to "Related Work Practices" and "Worker Recommendations" of the NIBS document may also be necessary.

M1 . Summary

Replacement of resilient asbestos floor tiles.

Summary This work practice covers the O&M procedures for removing small amounts of asbestos-containing floor tile and/or mastic. The Level 1 work practice is based on the RFCM procedures.

Examples

Level 1:
- A. Replacement of several floor tiles that are loose or can be removed with minimal or no breakage, and tile and/or mastic does not become friable.
- B. Remove well-adhered tile and/or mastic that is not likely to become friable.

Level 2:
- A. Replacement of an area of tiles that are sufficiently damaged that the tile and/or mastic will become friable during removal.

Level 3:
- A. Remove tile and mastic with an aggressive mechanical method which renders it friable.

Related Work Practices

M3 - Penetrate flooring covered with ACM

Worker Recommendations

One worker for Level 1 work. One or two workers for Level 2 depending upon safety and efficiency considerations. Two workers for Level 3. A person with air monitoring training might be required. This person can be a worker.

M1 . Level 1

Replacement of resilient asbestos floor tiles.

Examples

Level 1: (RFCM Procedures see page 144)

A. Replacement of several floor tiles that are loose or can be removed with minimal or no breakage, and tile and/or mastic does not become friable.

B. Remove well-adhered tile and/or mastic that is not likely to become friable.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Warning: Do not sand flooring or backing.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Weighted scraper with long handle
   - Wall scraper 2-3" (50-75 mm) wide stiff blade w/short handle
   - Commercial-type hand-held hot air blower or radiant heat source
   - Safety glasses
   - Weighted scraper with long handle
   - Wet/dry type HEPA vacuum with hose and attachments with metal floor tool
   - Garden sprayer with amended water
   - Hammer
   - Crushed dry ice (for procedure 5B) - approximately 1 lb (0.5 kg) per sq.ft. (0.1 m^2)
3. Place tools, equipment and materials needed in work area.
4. RFCM removal procedure is described in step 5A. An alternative non-RFCM procedure using dry ice is described in step 5B.
5. Clean the affected floor area with a wet/dry type HEPA vacuum and a metal floor attachment (no brush). Do not sweep.
6. A. Start the removal by carefully wedging the scraper in the seam of two adjoining tiles and gradually lifting the edge of the tile up and away from the floor. Try not to break pieces of the tile but continue to work the balance of the tile up by working the scraper beneath the tile and exerting both a forward pressure and a twisting action on the blade to promote release of the tile from the adhesive and the floor. Some tiles will release quite easily while others require varying degrees of force. When the adhesive is spread heavily or the tile is bonded tightly, it may easier to force the scraper through the tightly adhered areas by striking the scraper

handle with a hammer using blows of moderate force while maintaining the scraper at 25 to 30 degree angle to the floor. If you encounter areas where even the above methods will not remove the tile, the removal procedure can be simplified by thoroughly heating the tiles with a hot-air blower or a radiant heat source until the heat penetrates through the tile and softens the adhesive. **Caution:** Heating resilient tile or mastic might produce toxic vapors and a respirator with organic vapor cartridges might be needed.

B. Dry ice tile removal procedures:

Caution: The use of dry ice produces carbon dioxide that can result in an oxygen deficiency in the work area. Dry ice can also cause frostbite to workers and damage building materials.

Spread crushed dry ice over tiles to be removed. Let dry ice freeze mastic and release tile. Use short-handled scraper to pry up tiles.

7. When the tile is removed, place it, without breaking it, in disposal bags or containers which will be used for disposal. Removed tiles can be placed in empty tile cartons first and then placed in the disposal bags. To prevent tearing of the bag, place a maximum of one full carton of removed tile in a bag.
8. If new resilient floor tile is to be installed over a concrete subfloor using an asphaltic adhesive, the residual asphaltic "cutback" adhesive (mastic) must be left so that no ridges or puddles are evident and what remains is a thin, smooth film. This can be accomplished by wet-scraping the residual adhesive as follows:
   A. Start by adequately wetting the area where tile(s) were removed using amended water. Wet-scrape with a stiff-bladed wall or floor scraper, removing ridges and any loose adhesive.
   B. Place loosened adhesive residues into disposal bags or other containers.
   C. Wet vacuum standing water with the HEPA vacuum cleaner.
   D. Continue steps A through C until what remains of the residual asphaltic "cutback" adhesive is a thin, smooth film.
9. Clean the affected floor area with the HEPA vacuum cleaner using the metal floor tool to remove debris before applying new asphaltic adhesive or installing new resilient floor tile.
10. Perform required clean-up and tear-down steps on Level 1 checklist to complete work.

M1 . Level 2

Replacement of resilient asbestos floor tiles.

Example Level 2: A. Replacement of an area of badly damaged tiles that are sufficiently damaged that the tile and/or mastic will become friable during removal.

Notes

This work practice must be used in conjunction with General Procedures **W1, W4** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Use caution to prevent a fire in the work area if heat sources are used.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Special tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Commercial-type hand-held hot air blower or radiant heat source
   - Safety glasses
   - Heavy duty scraper with 4" (100 mm) blade and 6'-8' (2 m) handle
   - Weighted scrapper with long handle
   - Wet/dry type HEPA vacuum with hose and attachments
   - Hammer
3. Establish work area with barrier tape. See General Procedure W4. A plastic drop cloth may be used for dirty tools and bagged waste, if desired.
4. Place tools, equipment and materials needed in work area.
5. Clean the affected floor area with a wet/dry type HEPA vacuum and a metal floor attachment (no brush). Do not sweep.
6. Start the removal by carefully wedging the scraper in the seam of two adjoining tiles and gradually forcing the edge of the tile up and away from the floor. Try not to break off pieces of the tile but continue to force the balance of the tile up while working the scraper beneath the tile and exerting both a forward pressure and a twisting action on the blade to promote release of the tile from the adhesive and the floor. Some tiles will release quite easily while others require varying degrees of force. When the adhesive is spread heavily or the tile is bonded tightly, it may prove easier to force the scraper through the tightly adhered areas by striking the scraper handle with a hammer, using blows of moderate force while maintaining the scraper at a 25 to 30 degree angle to the floor. If you encounter areas where even the above methods will not remove the tiles, the removal procedure can be simplified by thoroughly heating the tiles with a hot-air blower or a radiant heat source until the heat penetrates through the tile and softens the adhesive. **Caution:** Heating resilient tile or mastic might produce toxic vapors and a respirator with organic vapor cartridges might be needed.

7. When the tile is removed, place it, without breaking it, in disposal bags or containers which will be used for disposal. Removed tiles can be placed in empty tile cartons first and then placed in the disposal bags. To prevent tearing of the bag, place a maximum of one full carton of removed tile in a bag.
8. If new resilient floor tile is to be installed over a concrete subfloor using an asphaltic adhesive, the residual asphaltic "cutback" adhesive must be left so that no ridges or puddles are evident and what remains is a thin, smooth film. This can be accomplished by wet-scraping the residual adhesive as follows:
   A. Start in the removal area farthest from the entrance door and adequately wet an area approximately 3' x 10' (1m x 3m) with amended water to aid in wetting the adhesive. Wet-scrape with a stiff-bladed wall or floor scraper removing ridges and any loose adhesive.
   B. Place loosened adhesive residues into disposal bags or other impermeable containers.
   C. Wet vacuum standing water with the HEPA vacuum cleaner.
   D. Continue steps A through C until what remains of the residual asphaltic "cutback" adhesive is a thin, smooth film.
9. Clean the affected floor with the HEPA vacuum cleaner using the metal floor tool to remove debris, followed by wet wiping, before applying new asphaltic adhesive or installing new resilient floor tile.
10. Install new floor tile and perform required clean-up and tear-down steps on Level 2 checklist to complete work.

M1 . Level 3

Replacement of resilient asbestos floor tiles.

Example Level 3: A. Remove tile and mastic with an aggressive mechanical method which renders it friable.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Safety glasses
   - Heavy duty scraper with 4" (100 mm) blade and 6'-8' (2m) handle
   - Weighted scraper with long handle
   - Wet/dry type HEPA vacuum with hose and attachments
   - Low speed floor grinder (190 RPM or less)
3. Prepare work area with mini-enclosure (without floor) and set up negative pressure system. See General Procedure W9. A glovebag may be used as an enclosure for small areas.
4. Place tools, equipment and materials needed into enclosure.
5. Adequately wet floor areas where tile and/or mastic will be removed.
6. Grind down high spots with floor grinder. Adequately wet any dust or debris generated by grinding.
7. HEPA vacuum affected floor area and wet wipe smooth portions of floor. Place disposable towels and debris into ACM disposal bags.
8. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

M2 . Summary

Replacement of vinyl sheet flooring with ACM backing.

Summary This work practice covers the O&M procedures for the replacement of small amounts of vinyl sheet flooring with ACM backing. Wet scraping of residual felt is included in all three Levels.

Examples

Level 1:
- A. Replacement of loose or perimeter-adhered vinyl sheet flooring with ACM backing.
- B. Replacement of adhered vinyl sheet flooring with ACM backing that can be removed using non-aggressive, primarily manual methods. Some separation of backing and wear layer will occur.

Level 2:
- A. Replacement of vinyl sheet flooring with ACM backing which is sufficiently damaged to be friable.

Level 3:
- A. Removal of vinyl sheet flooring with ACM backing using an aggressive mechanical method which renders the material friable.

Related Work Practices

M1 - Replacement of resilient asbestos floor tiles
M4 - Install new resilient flooring or carpet over resilient asbestos flooring
M9 - Remove carpet over resilient asbestos flooring

Worker Recommendations

Two workers. A person with air monitoring training might be required. This person can be a worker.

M2 . Level 1

Replacement of vinyl sheet flooring with ACM backing.

Examples

Level 1: (RFCM Procedures see page 144)

A. Replacement of loose or perimeter-adhered vinyl sheet flooring with ACM backing.

B. Replacement of adhered vinyl sheet flooring with ACM backing that can be removed using non-aggressive, primarily manual methods. Some separation of backing and wear layer will occur.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Warning: Do not sand flooring or backing.
Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Garden sprayer with amended water
   - Stiff bladed wall or floor scraper
   - Hook knife
   - Wet/dry type HEPA vacuum with hose and attachments with metal floor tool
3. Place tools, equipment and materials needed in work area.
4. Removal Procedure:
   - A. Remove any binding strips or other restrictive moldings from affected area.
   - B. Clean the affected floor area with the HEPA vacuum cleaner using the metal floor tool.
   - C. Make a series of parallel slices 4" to 8" (100-200 mm) apart through the flooring to be removed.
   - D. Removal: Pry up the corner of a strip of flooring. As the strip is being removed, adequately wet (using amended water) the removal point to minimize any airborne dust particles. When done properly, the floor and the back of the strip should be adequately wet. Do only one three-strip area at a time. Stand on the remaining floor covering or clean floor (do not stand on the felt). The sliced strip should be rolled around a core which will control the stripping angle to create a uniform tension. Tie or tape the removed material securely and place in disposal bags or containers for disposal.

E. Remove and dispose of each strip in the above manner. Avoid walking on the exposed felt as much as possible.

F. Occasionally, parts of the flooring will stick to the subfloor. This can often be eliminated by peeling in the opposite direction. The stiff-bladed scraper may aid in the removal or peeling of the flooring. If any residual felt backing remains on the subfloor, remove it using wet scraping methods set forth in step 6G.

G. Wet-scraping residual felt:

1. Adequately wet the residual felt with amended water. Wait for a few minutes to allow the amended water to soak into the felt.
2. Use the stiff-bladed scraper to scrape up the wet felt.
3. Rewet the felt if the amended water has not completely penetrated, if drying occurs, or if dry felt is exposed during scraping. Pick up the scrapings as they are removed from the floor and place in disposal bags or containers. Wet-scrape felt from affected floor area.
4. When this floor area has been cleaned free of felt, vacuum up any dirt using the HEPA vacuum cleaner with the metal floor tool. Position the vacuum cleaner so that the discharge air does not blow on the area being cleaned.
5. If HEPA vacuum filter or bag needs to be changed, use work practice M31.
6. Allow substrate to dry before installing new flooring.

5. Perform required clean up and tear-down steps on Level 1 checklist to complete work.

M2 . Level 2

Replacement of vinyl sheet flooring with ACM backing.

Example Level 2: A. Replacement of vinyl sheet flooring with ACM backing which is sufficiently damaged to be friable.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Warning: Do not sand flooring or backing.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Stiff bladed wall or floor scraper
   - Hook knife
   - Wet/dry type HEPA vacuum with hose and attachments
3. Install drop cloth if desired for dirty tools and bagged waste. See General Procedure W9.
4. Place tools, equipment and materials needed into work area.
5. Removal Procedure, Adhered Resilient Sheet Flooring:
   - A. Remove any binding strips or other restrictive moldings from affected area.
   - B. Clean the affected floor area with the HEPA vacuum cleaner using the metal floor tool.
   - C. Make a series of parallel slices 4" to 8" (100-200 mm) apart through the flooring to be removed.
   - D. Removal: Pry up the corner of a strip of flooring. As the strip is being removed, adequately wet (using amended water) the removal point to minimize any airborne dust particles. When done properly, the floor and the back of the strip should be adequately wet. Do only one three-strip area at a time. Stand on the remaining floor covering or clean floor (do not stand on the felt). The sliced strip should be rolled around a core which will control the stripping angle to create a uniform tension. Tie or tape the removed material securely and place in disposal bags or containers for disposal.
   - E. Remove and dispose of each strip in the above manner. Avoid walking on the exposed felt as much as possible.
   - F. Occasionally, parts of the flooring will stick to the subfloor. This can often be eliminated by peeling in the opposite direction. The stiff-bladed scraper may aid in the removal or peeling of the flooring. If any residual felt backing remains on the subfloor, remove it in accordance with step 6G.

G. Wet-scraping residual felt:
   1. Adequately wet the residual felt with amended water. Wait for a few minutes to allow the amended water to soak into the felt.
   2. Stand on the remaining floor covering (not the felt) and use the stiff-bladed scraper to scrape up the wet felt.
   3. Rewet the felt if the amended water has not completely penetrated, if drying occurs, or if dry felt is exposed during scraping. Pick up the scrapings as they are removed from the floor and place in disposal bags or containers. Wet-scrape felt from affected floor area before proceeding further.
   4. When floor area has been cleaned free of felt, vacuum up any dirt using the HEPA vacuum cleaner with the metal floor tool. Position the vacuum cleaner so that the discharge air does not blow on the area being cleaned.
   5. If HEPA vacuum filter or bag needs to be changed, use work practice W31.
   6. Allow substrate to dry before installing new flooring.

6. Perform required clean up and tear-down steps on Level 2 checklist to complete work.

M2 . Level 3

Replacement of vinyl sheet flooring with ACM backing.

Example Level 3: A. Removal of vinyl flooring with ACM backing using an aggressive mechanical method which renders the material friable.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Warning: Do not sand flooring or backing.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Stiff bladed wall or floor scraper
   - Hook knife
   - Wet/dry type HEPA vacuum with hose and attachments
3. Prepare regulated area with mini-enclosure (or by enclosing room) and set up negative pressure system. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure.
5. Enter enclosure and remove flooring per procedures under step 6.
6. Removal Procedure, Fully Adhered Resilient Sheet Flooring:
   - A. Remove any binding strips or other restrictive moldings from affected area.
   - B. Clean the affected floor area with the HEPA vacuum cleaner using the metal floor tool.
   - C. Make a series of parallel slices 4" to 8" (100-200 mm) apart through the flooring to be removed.
   - D. Wear layer removal: Pry up the corner of a strip of flooring, separating the backing from the wear layer. As the strip is being removed, adequately wet (using amended water) the delamination point to minimize any airborne dust particles. When done properly, the felt remaining on the floor and on the back of the strip should be thoroughly wet. Stand on the remaining floor covering or clean floor (do not stand on the felt). The sliced strip should be peeled from the backing by pulling or rolling around a core which will control the stripping angle to create a uniform tension (some resilient flooring wear layers might not be readily strippable and might require wet-scraping). Tie or tape the removed material securely and place in disposal bags or containers for disposal.
   - E. Remove and dispose of each succeeding strip in the above manner. Avoid walking on the exposed felt as much as possible.

F. Occasionally, parts of the top layer will stick to the backing. This can often be eliminated by peeling in the opposite direction. The stiff-bladed scraper might aid in the removal or peeling of the wear layer.

G. Wet-scraping residual felt backing:

1. Adequately wet the residual felt with amended water. Wait for a few minutes to allow the amended water to soak into the felt.
2. Stand on the remaining floor covering (not the felt) and use the stiff-bladed scraper to scrape up the wet felt.
3. Rewet the felt if the amended water has not completely penetrated, if drying occurs, or if dry felt is exposed during scraping. Pick up the scrapings as they are removed from the floor and place in disposal bags or containers. Wet-scrape felt from affected floor area.
4. When floor area has been cleaned free of felt, vacuum up any dirt using the HEPA vacuum cleaner with the metal floor tool. Position the vacuum cleaner so that the discharge air does not blow on the area being cleaned.
5. If HEPA vacuum filter or bag needs to be changed, use work practice W31.
6. Allow substrate to dry before installing new flooring.

7. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

M3 . Summary

Penetrate resilient asbestos flooring and subfloor.

Summary This work practice covers the procedures for drilling or cutting holes in resilient asbestos flooring and the subfloor below. If the flooring is badly damaged it may be advisable to remove it, rather than drilling holes in it.

Note: AHERA states that maintenance staff employees should be instructed not to drill holes in ACM. Only properly trained employees should undertake such activities.

Examples

Level 1:	A.	Remove small amounts of resilient asbestos flooring covering to drill hole(s) in subfloor to attach object to floor or install a pipe or conduit.
Level 2:	A.	Drill or cut a few hole(s) in resilient asbestos flooring to install pipe or conduit.
Level 3:	A.	Drill or cut multiple holes in badly damaged resilient asbestos flooring.
	B.	Cut hole in resilient asbestos flooring with power saw for square duct.

Related Work Practices

M1 - Replacement of resilient asbestos floor tiles
M2 - Replacement of vinyl sheet flooring with ACM backing
M9 - Removal carpet over resilient asbestos flooring

Worker Recommendations

One worker for Level 1 work. One or Two workers for Level 2 depending upon safety and efficiency considerations. Two workers for Level 3. A person with air monitoring training might be required. This person can be a worker.

M3 . Level 1

Penetrate resilient asbestos flooring and subfloor.

Example Level 1: A. Remove small amount of resilient asbestos floor covering to drill hole(s) in subfloor to attach object to floor or install a pipe or conduit.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Scraper
   - Drill
   - Hook Knife
3. Place tools, equipment and materials needed in work area.
4. Cut out a piece of resilient asbestos flooring larger than the hole to be drilled using utility or hook knife. Use scraper to pry up a piece of flooring. Place flooring piece into disposal bag, adequately wet mastic or residual felt using amended water and scrape up using M1 Level 1 step 7 procedures for tile and M2 Level 1 step 4F for vinyl sheet flooring.
5. Drill hole into subfloor as needed.
6. Clean up dust and debris using HEPA vacuum.
7. Perform maintenance work required and clean-up and tear-down steps on Level 1 checklist to complete work.

M3 . Level 2

Penetrate resilient asbestos flooring and subfloor.

Example Level 2: A. Drill or cut a few hole(s) in resilient asbestos flooring to install pipe or conduit.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area if debris from work may fall on ceiling below. **See work practices S1, M11, M13 or M24.**

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Drill or hole saw with HEPA vacuum attachment
   - Small stiff-bladed scraper
3. Prepare work area with drop cloth covering work area except where holes are being drilled. See General Procedure W9. If hole being drilled or cut is to penetrate through floor, an enclosure will be needed on the underside to catch any dust or debris that may fall to floor below.
4. Place tools, equipment and materials needed onto drop cloth.
5. Adequately wet area where penetration must be made using amended water and, if desired, cut out a piece of flooring larger than the hole to be made using utility knife and scraper.
6. Using drill or hole saw with wetting or attached HEPA vacuum, perform drilling or cutting operation. Wet all dust or debris generated using amended water.
7. Clean up dust and debris using HEPA vacuum and/or wet wiping and place disposable towels into disposal bags.
8. If hole was drilled through floor, wet any debris or dust in enclosure and underside. Package debris or dust as ACM waste.
9. Perform maintenance work required and clean-up and tear-down steps on Level 2 checklist to complete work.

M3 . Level 3

Penetrate resilient asbestos flooring and subfloor.

Example Level 3:

A. Drill or cut multiple holes in badly damaged resilient asbestos flooring.

B. Cut hole in resilient asbestos flooring with power saw for square duct.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area if debris from work may fall on ceiling below. **See work practices, S1, M11, M13 or M24.**

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Drill or saw with HEPA vacuum attachment
   Small stiff-bladed scraper
3. Prepare work area with mini-enclosure and set up negative pressure system or HEPA filtered local exhaust ventilation. Do not cover floor where holes are to be drilled or cut. See General Procedure W9. If hole being drilled or cut is to penetrate through floor, an enclosure will be needed on the underside to catch any dust or debris that may fall to floor below.
4. Place tools, equipment and materials needed into enclosure.
5. Enter enclosure, and adequately wet area where penetration must be made using amended water. If desired, cut out a piece of flooring larger than the hole to be made using utility knife and scraper.
6. Using drill or saw with wetting or attached HEPA vacuum, perform drilling or cutting operation. Wet all dust or debris generated using amended water.
7. Clean up dust and debris using HEPA vacuum and/or wet wiping and place disposable towels into disposal bags.
8. If hole was drilled through floor, wet any debris or dust in enclosure and underside. Package debris or dust as ACM waste.
9. Perform maintenance work required and clean-up and tear-down steps on Level 3 checklist to complete work.

M4 . Summary

Install new resilient flooring or carpet over resilient asbestos flooring.

Summary This procedure covers the work required to prepare resilient asbestos flooring for the installation of new resilient flooring or carpet. This procedure works with work practice M6 for stripping asbestos flooring and assumes that any damaged flooring has been repaired or replaced using applicable work practices such as M1 and M2.

Example Level 1: A. New carpet being installed over well-adhered resilient asbestos floor tile or vinyl sheet flooring with ACM backing in good condition.

Related Work Practices

M1 - Replacement of resilient asbestos floor tiles
M2 - Replacement of vinyl sheet flooring with ACM backing
M6 - Wet strip floor wax from resilient asbestos flooring
M7 - Buffing resilient asbestos flooring
M8 - Cleaning resilient asbestos flooring

Worker Recommendations

One worker is usually sufficient. Two or more workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

M4 . Level 1

Install new resilient flooring or carpet over resilient asbestos flooring.

Example Level 1: A. New carpet being installed over well-adhered resilient asbestos tile or vinyl sheet flooring with ACM backing in good condition.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist** The worker checklist includes tasks that must be performed before these work practices are begun.

Review manufacturer's recommendations concerning installation of new flooring over existing before proceeding with this work. Coordinate this work with floor stripping work practice M6 as required in step 5.
Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Scraper 2-3" (50-75 mm) wide stiff blade
3. Place tools, equipment and materials needed into work area.
4. HEPA vacuum area where flooring will be installed.
5. Strip wax/finish from existing floor using O&M work practice M6.
6. Level off any minor high spots on floor using scraper. Do not sand or grind flooring.
7. Fill any low areas using manufacturers recommended underlayment or Leveling compound.
8. Install new flooring or carpet as recommended by manufacturer.
9. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

M5 . Summary

Install partition over resilient asbestos flooring.

Summary This work practice describe the procedures for installing a wall over resilient asbestos flooring that will remain in place. If flooring will be removed for wall installation, use work practice M1 or M2.

Note: It may be more efficient to remove flooring using M1 or M2 and then install partition.

Examples

Level 1:	A.	Install partition over resilient asbestos flooring that is well adhered and in good condition.
Level 2:	A.	Install partition over resilient asbestos flooring that becomes friable during the partition installation.

Related Work Practices

M1 - Replacement of resilient asbestos floor tiles
M2 - Replacement of vinyl asbestos sheet flooring with ACM backing
M3 - Penetrate resilient asbestos flooring and subfloor
M4 - Install new resilient flooring or carpet over resilient asbestos flooring

Worker Recommendations

One worker. Two workers may be beneficial for erecting partition. A person with air monitoring training might be required. This person can be a worker.

M5 . Level 1

Install Partition over resilient asbestos flooring.

Example Level 1: A. Install partition over resilient asbestos flooring that is well-adhered and in good condition.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Anchoring devices and equipment
   - Non-asbestos adhesive
3. Place tools, equipment and materials needed in work area.
4. Install base plate of wall on full bed of adhesive and attach to floor using appropriate anchoring devices.
5. HEPA vacuum any chips or dust generated during fastening operation.
6. Complete installation of wall.
7. Perform cleanup and tear down steps on Level 1 checklist to complete work.

M5 . Level 2

Install Partition over resilient asbestos flooring.

Example Level 2: A. Install partition over resilient asbestos flooring that becomes friable during the partition installation.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

It might be more efficient to remove flooring using M1 or M2 and then install partition.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Anchoring devices/equipment
   - Non-asbestos adhesive
3. Prepare work area with drop cloth. Do not install drop cloth where wall will attach to floor. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Using garden sprayer with amended water, adequately wet flooring area where work is to be done.
6. Level off any minor high spots on floor using scraper. Do not sand or grind flooring.
7. Remove any damaged vinyl asbestos flooring in area of work using O & M work practice M1 or M2.
8. Fill any low areas using manufacturers recommended Leveling compound.
9. Install base plate of wall on full bed of adhesive and attach to floor using appropriate anchoring devices.
10. HEPA vacuum any chips or dust generated during fastening operation.
11. Complete installation of wall.
12. Perform cleanup and tear down steps on Level 2 checklist to complete work.

M6 . Summary

Wet strip floor wax from resilient asbestos flooring.

Summary This work practice covers the procedures for stripping floor wax or finish from resilient asbestos flooring. Do not strip damaged flooring. Any loose or damaged flooring should be repaired or replaced before stripping is started. Wet stripping, if performed properly, should not cause damage to resilient flooring. If any flooring damage occurs during stripping, stop work and make repairs using applicable work practice(s). Do not dry strip, scrape, sand, or grind resilient asbestos flooring to remove any blemishes or imperfections.

This procedure is based on EPA's recommended Interim Guidance Memorandum for Maintenance of Asbestos-Containing Floor Coverings, January 25, 1990.

Example Level 1: A. Stripping floor wax or finish coat from resilient asbestos flooring that is well adhered and in good condition.

Related Work Practices

M1 - Replacement of resilient asbestos floor tiles
M4 - Install new resilient flooring or carpet over resilient asbestos flooring
M7 - Buffing resilient asbestos flooring
M8 - Cleaning resilient asbestos flooring

Worker Recommendations

One worker trained in wet stripping procedures for resilient asbestos flooring. A person with air monitoring training might be required. This person can be the worker.

M6 . Level 1

Wet strip floor wax from resilient asbestos flooring.

Example Level 1: A. Strip floor wax or finish coat from resilient asbestos flooring that is well-adhered and in good condition.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Stripping pads should be kept wet during use and rinsed thoroughly immediately after use and prior to storage. Dispose of pads, if contaminated, as ACM waste in labeled disposal bags.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - "Caution - Wet Floor" signs
   - Floor stripping machine
   - Stripping Pads (least abrasive pad possible)
   - Buckets with water for rinsing
   - Mops (for stripping, rinsing and polishing)
   - Chemical stripper - recommended amount for area to be stripped
   - Floor wax or finish
   - Walk-off mats
3. Place tools, equipment and materials needed in work area. Place walk-off mats where required to prevent tracking of stripping solution to other areas. Position "Caution - Wet Floor" signs.
4. After proper mixing of stripping chemical, adequately wet floor by mop applying liberal amounts of the solution. Allow chemical to soak for amount of time recommended by manufacturer. If areas become dry, reapply solution to keep floor adequately wet.
5. After wax or finish has softened, strip flooring using least abrasive pad and low speed setting (175-190 RPM maximum). Keep floor adequately wet during machine operation. Do not overstrip. Stop stripping when the old wax or finish is removed. Work small areas at a time.
6. Remove dirty stripping solution with wet vacuum or "strip" mop.
7. With "rinse" mop, apply liberal amount of clean water to area stripped and remove water with wet vacuum or mop. Repeat rinse procedures.
8. If some spots of wax or finish remain, restrip those areas.
9. If new flooring will be installed over the stripped floor, do not apply wax or finish. When applying new wax or finish, do so according to manufacturer's recommendations.
10. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

M7 . Summary

Dry or spray buffing resilient asbestos flooring.

Summary This work practice covers the procedures for spray buffing the polish to restore gloss on resilient asbestos flooring. Do not buff damaged flooring. Any loose or damaged flooring should be repaired or replaced before buffing is started. This practice assumes that the floor has adequate coats of polish, and that the flooring itself will not be damaged or contacted by the buffing equipment. If any flooring damage occurs during buffing, stop work and make repairs using applicable work practice(s). If polish is in poor condition, use work practice M6 or M8.

Example Level 1: A. Dry or spray buff the polish on resilient asbestos flooring to remove minor surface imperfections and restore gloss.

Related Work Practices

M6 - Strip floor wax from resilient asbestos flooring
M8 - Cleaning resilient asbestos flooring

Worker Recommendations

One worker trained in spray buffing procedures for asbestos flooring. A person with air monitoring training might be required. This person can be the worker.

M7 . Level 1

Dry or spray buffing resilient asbestos flooring.

Example

Level 1: (RFCM Procedures see page 144)

A. Dry or spray buff the polish on resilient asbestos flooring to remove minor surface imperfections and restore gloss.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Dispose of pads, if contaminated, as ACM waste in labeled disposal bags.

Work Practice

1. Perform applicable pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - "Caution - Wet Floor" signs
   - Floor buffing machine
   - Buffing Pads (least abrasive - tan, red, or equivalent)
   - Buckets with mop wringer
   - Mops (for damp or spot mopping)
   - Chemical cleaner
   - Hand-held scraper
   - Spray buffing compound, appropriately diluted, compatible polish and restorer chemical
3. Place tools, equipment and materials needed in work area. Position "Caution-Wet Floor" signs.
4. Pick up any large loose debris and place into disposal bags. Using scraper and water, remove all foreign matter from the finished surface (gum, tar, stickers, etc.).
5. Spot or damp mop to remove stains and spills. Mix chemical cleaner or restorer with water and apply according to manufacturers recommendations. Spot or damp mop to remove stains and spills. If dry buffing will be performed, apply restorer chemical as required.
6. Allow floor to dry thoroughly.
7. A. To spray-buff, spray small area with spray-buff solution and buff using manufacturer's recommended pad or brush at recommended RPM. Repeat procedure until entire area is spray-buffed.
   B. To dry buff, buff or dry burnish with manufacturer's recommended pad or brush at recommended RPM.
8. Perform applicable steps on Level 1 checklist to complete work.

M8 . Summary

Cleaning resilient asbestos flooring.

Summary This work practice covers the procedures for cleaning (or scrubbing) the polish on resilient asbestos flooring prior to buffing or application of additional polish. Do not polish loose or damaged resilient flooring. Any damage should be repaired before cleaning begins using the applicable work practice(s). Stop work if any damage occurs during cleaning and make repairs needed.

Example Level 1: A. Clean or scrub resilient asbestos flooring with adequate coats of floor polish on flooring before buffing or application of additional polish.

Related Work Practices

M6 - Wet strip floor wax from resilient asbestos flooring
M7 - Dry or spray buffing resilient asbestos flooring

Worker Recommendations

One worker trained in cleaning procedures for asbestos flooring. A person with air monitoring training might be required. This person can be the worker.

M8 . Level 1

Cleaning resilient asbestos flooring.

Example Level 1: A. Clean or scrub resilient asbestos flooring with adequate coats of floor polish on flooring before buffing or application of additional polish.

Notes This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - "Caution - Wet Floor" signs
   - Floor scrubbing machine
   - Pads (least abrasive)
   - Buckets with mop wringer
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Mops (for scrubbing, rinsing)
   - Measuring device for mixing chemical cleaner
   - Walk-off mats
   - Chemical cleaner
3. Place tools, equipment and materials needed in work area. Place walk-off mats to prevent tracking of scrubbing solution to other areas. Position "Caution - Wet Floor" signs.
4. Install polyethylene sheet on adjoining floors for protection from any spilled cleaning solution.
5. Mix scrubbing chemical with water as recommended by manufacturer and apply liberal amount (do not flood) using mop. Allow to soak for amount of time recommended by manufacturer. Keep floor adequately wet by reapplying cleaning solution if drying occurs. Work small areas at a time.
6. Using floor scrubbing machine, manufacturer's recommended pads and operating speed, clean floor to remove embedded dirt and surface marks.
7. Remove spent scrubbing solution with wet vacuum or mop.
8. Rinse area using clean mop and clean rinse water. Remove water with wet vacuum or mop. Damp mop area to clean up any remaining water or streaks.
9. Perform applicable steps on Level 1 checklist to complete work.

M9 . Summary

Remove carpet over resilient asbestos flooring.

Summary This work practice describes the procedures to be used for removing a small area of carpet installed over resilient asbestos flooring for O&M work.

These procedures assume that the carpet adhesive or mastic does not contain asbestos, and that contamination is not present on the top side of the carpet. If a large area is involved, the work might require that abatement procedures be used. If carpet mastic contains asbestos, see Work Practice M1. Removal of well-adhered carpet can pull up resilient asbestos flooring beneath the carpet.

Examples

Level 1:	A.	Remove carpet that is non-adhered or weakly adhered to resilient asbestos flooring.
Level 2:	A.	Remove carpet adhered to good condition resilient asbestos flooring where mastic and/or a small number of tiles may be pulled up, or flooring may be pulled up without separation of backing and wear layer. Resilient flooring mastic may or may not contain asbestos.
Level 3:	A.	Remove carpet-adhered to poor condition or loose resilient asbestos flooring and/or mastic that will break, tear or become friable during removal.

Related Work Practices

M1 - Replacement of resilient asbestos floor tiles.
M2 - Replacement of vinyl sheet flooring with ACM backing.
M4 - Installation of new resilient flooring or carpet over resilient asbestos

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Worker Recommendations

One worker for Level 1 work. One or two workers for Level 2 depending upon safety and efficiency considerations. Two workers for Level 3.

A person with air monitoring training might be required. This person can be a worker.

M9 . Level 1

Remove carpet over resilient asbestos flooring.

Example Level 1: A. Remove carpet that is non-adhered or weakly adhered to resilient asbestos flooring.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Review manufacturer's recommendation concerning installation of new carpet over old flooring and/or adhesive before proceeding with this work.

If asbestos-containing adhesive must be removed, refer to wet-scraping procedures in Work Practice M1.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Metal straightedge for use when cutting carpet
   - Scraper 2-3" (50-75 mm) wide stiff blade
3. Place tools, equipment and materials needed in work area.
4. Find a seam or corner where carpet removal can begin. If no seams or corners exist, make a cut around the piece to be removed. Cut carpet using utility knife with a new blade.
5. Pry up corner or seam of carpet using scraper. Pull back a section large enough (approximately one square foot [0.1 m^2]) to hang onto while removing carpet. HEPA vacuum exposed flooring and back of carpet.
6. Pull carpeting back slowly and HEPA vacuum exposed flooring & back of carpet. Remove carpet in pieces no larger than 200 square feet (18.6 m^2).
7. If carpet and adhesive are non-ACM, roll up carpet and dispose of as non-ACM waste. If portions of asbestos-containing flooring remain attached to carpet backing, dispose of carpet as ACM or in accordance with applicable regulations.
8. HEPA vacuum surface of flooring after carpet is removed. If residual asbestos-containing adhesive or residual felt backing needs to be removed, follow wet-scraping procedures in work practice M1 or M2, respectively. Allow substrate to dry before installing new flooring.
9. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

M9 . Level 2

Remove carpet over resilient asbestos flooring.

Example Level 2: A. Remove carpet adhered to good condition resilient asbestos flooring where mastic and/or a small number full tiles may be pulled up, or flooring might be pulled up without separation of backing and wear layer. Resilient flooring mastic may or may not contain asbestos.

Notes

This work practice must be used in conjunction with General Procedures **W1, W4** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Review manufacturer's recommendation concerning installation of new carpet over old flooring and/or adhesive before proceeding with this work.

If asbestos-containing adhesive must be removed, refer to wet-scraping procedures in Work Practice M1. Avoid foot traffic on any exposed mastic.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Metal straightedge for use when cutting carpet
3. Prepare work area. See General Procedure W4.
4. Place tools, equipment and materials needed into work area.
5. Find a seam or corner wherever carpet removal can begin. If no seams or corners exist, a cut will need to be made around the piece to be removed. Wet the areas that need to be cut using amended water. Cut carpet using utility knife with a new blade.
6. Pry up corner or seam of carpet using scraper. Pull back a section large enough (approximately one square foot [0.1 m^2]) to hang onto while removing carpet. Adequately wet flooring and adhesive exposed.
7. Pull carpeting back slowly and spray amended water on flooring and adhesive as they are exposed. Remove carpet in pieces no larger than approximately 200 square feet (18.6 m^2).
8. If carpet and adhesive are non-ACM, roll up carpet and dispose of as non-ACM waste. If portions of asbestos-containing flooring remain attached to carpet backing, dispose of carpet as ACM. Loose vinyl asbestos flooring shall be disposed of in disposal bags or containers.
9. HEPA vacuum surface of flooring after carpet is removed. If residual asbestos-containing adhesive or residual felt backing needs to be removed, follow wet-scraping procedures in work practice M1 or M2, respectively. Allow substrate to dry before installing new flooring.
10. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

M9 . Level 3

Remove carpet over resilient asbestos flooring.

Example Level 3: A. Remove carpet adhered to poor condition or loose resilient asbestos flooring and/or mastic that will break, tear or become friable during removal.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Review manufacturer's recommendation concerning installation of new carpet over old flooring and/or adhesive before proceeding with this work.

If asbestos-containing resilient flooring adhesive must be removed, refer to wet-scraping procedures in Work Practice M1. Avoid foot traffic on any exposed mastic.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Metal straightedge for use when cutting carpet
   - Latex paint in airless sprayer
3. Prepare work area with erect mini-enclosure and set up negative pressure system. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure.
5. If carpet is, or will be contaminated after removal, spray with latex paint to encapsulate and discourage reuse.
6. Enter enclosure and find a seam or corner where carpet removal can begin. If no seams or corners exist, make a cut around the piece to be removed. Wet the areas that need to be cut using amended water. Cut carpet using utility knife with a new blade.
7. Pry up corner or seam of carpet using scraper. Pull back a section large enough (approximately one square foot [0.1 m^2]) to hang onto while removing carpet. Adequately wet flooring and adhesive exposed.
8. Pull carpeting back slowly and spray amended water on flooring and adhesive as they are exposed. Remove carpet in pieces no larger than area inside mini-enclosure.
9. If carpet and adhesive are non-ACM, roll up carpet and dispose of as non-ACM waste. If portions of asbestos-containing flooring remain attached to carpet backing, dispose of carpet as ACM. Loose vinyl asbestos flooring shall be disposed of in disposal bags or containers.
10. HEPA vacuum surface of flooring after carpet is removed. If residual asbestos-containing adhesive or residual felt backing needs to be removed, follow wet-scraping procedures in work practice M1 or M2, respectively. Allow substrate to dry before installing new flooring.

11. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

M10 . Summary

Clean potentially asbestos-contaminated carpet.

Summary This work practice describes the O&M procedures to be used for cleaning small areas of asbestos-contaminated carpet. If contamination is present due to a fiber release, see work practice M29.

Note: EPA's Green Book indicates that routine use of a special cleaning work practice is not required if asbestos-containing dust or debris is not present and deterioration or damage to ACM is unlikely. While NIBS is not recommending its use as a routine mandatory asbestos control procedure in this case, the Level 1 work practice is being provided for those operations and maintenance programs which choose to use it.

Examples

Level 1:	A.	Clean potentially asbestos-contaminated carpet that has no visible contamination or analytical confirmation of asbestos contamination. ACM in room is in good condition.
Level 2:	A.	Clean carpet that has some visual or analytical evidence of asbestos contamination.

Related Work Practices

M9 - Remove carpet over resilient asbestos flooring.
M4 - Install new resilient flooring or carpet over resilient asbestos flooring.

Worker Recommendations

One worker. A person with air monitoring training might be required. This person can be the worker.

M10 . Level 1

Clean potentially asbestos-contaminated carpet.

Example Level 1: A. Clean potentially asbestos-contaminated carpet that has no visible contamination or analytical confirmation of asbestos contamination. ACM in room is in good condition.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

EPA's Green Book indicates that routine use of a special cleaning work practice is not required if asbestos-containing dust or debris is not present and deterioration or damage to ACM is unlikely. While NIBS is not recommending its use as a routine mandatory asbestos control procedure in this case, the Level 1 work practice is being provided for those operations and maintenance programs which choose to use it.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Carpet attachment for HEPA vacuum
3. Place tools, equipment and materials needed in work area.
4. HEPA vacuum carpet using carpet attachment.
5. Perform applicable steps on Level 1 checklist to complete work.

M10 . Level 2

Clean potentially asbestos-contaminated carpet.

Example Level 2: A. Clean carpet that has some visual or analytical evidence of asbestos contamination.

Notes This work practice must be used in conjunction with General Procedures **W1, W4** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   HEPA vacuum with beater bar or carpet steam cleaning equipment.
3. Prepare work area with critical barriers. See General Procedure W4.
4. Place tools, equipment and materials needed into work area.
5. Clean carpet using one of the following procedures:
   A. With HEPA vacuum, vacuum contaminated area in parallel passes with each pass overlapping the previous by one half the width of the beater bar. Vacuum the area a second time, in the same manner, in passes at right angles to the first passes.
   B. With steam cleaning equipment, clean carpet in accordance with manufacturer's equipment instructions. Clean in overlapping passes in one direction, and then a second time in overlapping passes at right angles to the first passes. Water from cleaning operation shall be disposed of in accordance with applicable regulations. See General Procedure W18.
6. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

M11 . Summary

Remove asbestos-containing ceiling panels in lay-in ceiling system.

Summary This work practice covers the procedure for removing a small number of asbestos-containing ceiling panels in a lay-in ceiling system, such as a 2' x 4' or 2' x 2' (600 x 1200 mm or 600 x 600 mm) suspended ceiling for O&M work. The practices assume that surfacing ACM is not present above the ceiling. If surfacing is present, see work practice S1.

Examples

Level 1:	A.	Move one or several panels in good condition that do not offer resistance to being moved, and where edges do not abrade.
Level 2:	A.	Remove several asbestos-containing ceiling panels to perform maintenance work on or above ceiling where the panel(s) offer resistance to being moved and/or the edges are or will be abraded.
Level 3:	A.	Remove damaged, broken, or soiled asbestos-containing ceiling panels alone or in conjunction with maintenance work above ceiling.

Related Work Practices

S1 - Move one non-asbestos-containing ceiling panel below a plenum space that has exposed surfacing ACM.
M12 - Replace asbestos-containing ceiling tiles attached with adhesive.
M13 - Replace asbestos-containing ceiling tiles in spline ceiling system.

Worker Recommendations

One worker for Level 1 work. One or two workers for Level 2 depending upon safety and efficiency considerations. Two workers for Level 3. A person with air monitoring training might be required. This person can be a worker.

M11 . Level 1

Remove asbestos-containing ceiling panels in lay-in ceiling system.

Example Level 1: A. Move one or several panels in good condition that do not offer resistance to being moved, and where edges do not abrade.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with O & M Work Practice S1 if surfacing ACM is present above ceiling.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Non-asbestos replacement ceiling panels, if needed.
3. Place tools, equipment and materials needed in work area.
4. Set up ladder or scaffold in work area.
5. If panel will be replaced, remove ceiling panel and place into disposal bag. If panel will be reinstalled, remove carefully and store for reinstallation.
6. HEPA vacuum area where tile was installed and any suspension system components exposed where tile was removed.
7. Perform maintenance work and reinstall existing panels or install new panels.
8. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

M11 . Level 2

Remove asbestos-containing ceiling panels in lay-in ceiling system.

Example Level 2: A. Remove several asbestos-containing ceiling panels to perform maintenance work on or above ceiling where the panel(s) offer resistance to being moved and/or the edges are or will be abraded.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with O & M Work Practice S1 if surfacing ACM is present above ceiling.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional special tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Stiff nylon bristle brushes
   - Non-asbestos replacement ceiling panels, if needed
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth. Set up ladder or scaffold and adequately wet ceiling panel(s), if panel(s) will be replaced.
5. If panel(s) will be replaced, remove ceiling panel(s) and place into disposal bag. If panel(s) will be reinstalled, remove carefully and store for reinstallation.
6. HEPA vacuum area where panel(s) were installed. Wet wipe any suspension system components exposed where panel(s) were removed. Use brushes to remove any debris that is not removed by wet wiping. Place wet wipes and any debris into disposal bags.
7. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

M11 . Level 3

Remove asbestos-containing ceiling panels in lay-in ceiling system.

Example Level 3: A. Remove damaged, broken, or soiled asbestos-containing ceiling panels alone or in conjunction with maintenance work above ceiling.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with O & M Work Practice S1 if surfacing ACM is present above ceiling.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Stiff nylon bristle brushes
   - Non-asbestos replacement ceiling panels, if needed
3. Prepare work area with erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Enter enclosure and set up ladder or scaffold inside enclosure.
5. Adequately wet ceiling panel(s) and remove.
6. HEPA vacuum area where panel(s) were installed. Wet wipe any suspension system components exposed where panel(s) were removed. Use brushes to remove any debris that is not removed by wet wiping. Place wet wipes and any debris into disposal bags.
7. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

M12 . Summary

Remove asbestos-containing ceiling tiles attached with adhesive.

Summary This work practice covers the O&M procedures for removing a small number of asbestos-containing ceiling tiles attached with adhesive. These most commonly are 12" (13 mm) tiles glued to a substrate such as gypsum board or plaster. The procedures assume that the tile adhesive does not contain asbestos.

Examples

Level 2:

A. Remove ceiling tiles that can be removed as whole tiles without breakage. Small pieces of tile may remain attached to adhesive on ceiling.

Level 3:

A. Remove ceiling tiles that will break during removal.
B. Remove badly damaged ceiling tiles.

Related Work Practices

M11 - Remove asbestos-containing ceiling panels in lay-in ceiling system.
M13 - Remove asbestos-containing ceiling tiles in spline ceiling system.
M24 - Remove section of asbestos-containing drywall.

Worker Recommendations

One or two workers for Level 2 depending upon safety and efficiency considerations. Two workers for Level 3. A person with air monitoring training might be required. This person can be a worker.

M12 . Level 2

Remove asbestos-containing ceiling tiles attached with adhesive.

Example Level 2: A. Remove ceiling tiles that can be removed as whole tiles without breakage. Small pieces of tile may remain attached to adhesive on ceiling.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Non-asbestos replacement ceiling panels and adhesive
   Scraper or other tools as needed to remove tiles
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth. Set up ladder or scaffold on drop cloth.
5. Adequately wet ceiling tiles to be removed.
6. Cut away outer 1/2" (13 mm) of tile on tongue and grove edges. Pry tile away from substrate to break adhesive bond, remove ceiling tiles and place into disposal bags.
7. HEPA vacuum area where tiles were installed. Wet wipe any smooth finished components exposed where tiles were removed. Use scraper to remove any remaining adhesive or debris.
8. Install new ceiling tiles and perform clean-up and tear-down steps on Level 2 checklist to complete work.

M12 . Level 3

Remove asbestos-containing ceiling tiles attached with adhesive.

Examples Level 3:

A. Remove ceiling tiles that will break during removal.
B. Remove badly damaged ceiling tiles.

Notes

This work practice must be used in conjunction General Procedures W1 and W9 and a Level 3 Worker Checklist.

The checklist includes tasks that must be performed before these work practices are used.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Non-asbestos replacement ceiling panels and adhesive
   - Scraper or other tools as needed to remove tiles
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Enter enclosure and set up ladder or scaffold inside enclosure.
5. Adequately wet ceiling tiles to be removed.
6. Cut away outer 1/2" (13 mm) of tile on tongue and grove edges. Pry tile away from substrate to break adhesive bond, remove ceiling tiles and place into disposal bags.
7. HEPA vacuum area where tiles were installed. Wet wipe any smooth finished components exposed where tiles were removed. Use scraper to remove any remaining adhesive or debris. Place wet wipes and debris into ACM disposal bags.
8. Install new ceiling tiles and perform clean-up and tear-down steps on Level 3 checklist to complete work.

M13 . Summary

Remove asbestos-containing ceiling tiles in spline ceiling system.

Summary This work practice covers the O&M procedure for removing small numbers of asbestos-containing ceiling tiles in a spline ceiling system. Procedures assume that tile adhesive does not contain asbestos.

Examples

Level 1:	A.	Remove one or several tiles that are designed for easy removal or have been previously removed. Tiles come out whole and edges will not be abraded.
Level 2:	A.	Remove tiles that can be removed as whole tiles without breakage.
Level 3:	A.	Remove ceiling tiles that will break during removal.
	B.	Remove badly damaged ceiling tiles.

Related Work Practices

M11 - Remove asbestos-containing ceiling panels in lay-in ceiling system.
M12 - Remove asbestos-containing ceiling tiles attached with adhesive.
M24 - Remove section of asbestos-containing drywall.

Worker Recommendations

One or two workers for Level 2 depending upon safety and efficiency considerations. Two workers for Level 3. A person with air monitoring training might be required. This person can be a worker.

M13 . Level 1

Remove asbestos-containing ceiling tiles in spline ceiling system.

Example Level 1: A. Remove one or several tiles that are designed for easy removal or have been previously removed. Tiles come out whole and edges will not be abraded.

Notes

This work practice must be used in conjunction with General Procedure W1 and a Level 1 Worker Checklist.

The checklist includes tasks that must be performed before these work practices are used.

Coordinate work with O & M Work Practice S1 if surfacing ACM is present above ceiling. Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Non-asbestos replacement ceiling panels and straight pins
3. Place tools, equipment and materials needed in work area.
4. Set up ladder or scaffold.
5. Remove ceiling tiles and place into disposal bags.
6. HEPA vacuum or wet wipe area where tiles were installed and suspension system components exposed where tiles were removed.
7. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

M13 . Level 2

Remove asbestos-containing ceiling tiles in spline ceiling system.

Example Level 2: A. Remove tiles that can be removed as whole tiles without breakage.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with O & M Work Practice S1 if surfacing ACM is present above ceiling.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Non-asbestos replacement ceiling panels and straight pins
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Set up ladder or scaffold and adequately wet ceiling tiles to be removed.
6. Cut away outer 1/2" (13 mm) of tiles on edges set on splines. Remove ceiling tiles and place into disposal bags.
7. HEPA vacuum area where tiles were installed. Wet wipe any suspension system components exposed where tiles were removed.
8. Install new tiles using pins into adjacent tiles to secure in place.
9. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

M13 . Level 3

Remove asbestos-containing ceiling tiles in spline ceiling system.

Examples Level 3:

A. Remove ceiling tiles that will break during removal.
B. Remove badly damaged ceiling tiles.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with O & M Work Practice S1 if surfacing ACM is present above ceiling.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Non-asbestos replacement ceiling panels and straight pins
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Enter enclosure and set up ladder or scaffold inside enclosure.
5. Adequately wet ceiling tiles to be removed.
6. Cut away outer 1/2" (13 mm) of tiles on edges set on spline. Remove ceiling tiles and place into disposal bags.
7. HEPA vacuum area where tiles were installed. Wet wipe any smooth finished components exposed where tiles were removed.
8. Install new tiles using pins into adjacent tiles to secure in place.
9. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

M14 . Summary

Cut or drill asbestos cement panels.

Summary This work practice covers the procedures cutting or drilling asbestos cement panels.

Examples

Level 2:	A.	Drill asbestos cement board to install a new electrical panel.
Level 3:	A.	Cut or drill asbestos cement panel to install a vent through panel using power tools.

Related Work Practices

M15 - Remove asbestos cement.
M23 - Cut or drill asbestos-containing drywall or drywall compound.

Worker Recommendations

One worker for Level 2. Two workers for Level 3. A person with air monitoring training might be required. This person can be a worker.

M14 . Level 2

Cut or drill asbestos cement panels.

Example Level 2: A. Drill asbestos cement board to install a new electrical panel.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Hand or power drill as needed (power tools should have a HEPA vacuum attachment)
3. Prepare work area with drop cloth. See General Procedure W9. If accessible, install a drop cloth on the back side of the panel below where hole will penetrate through panel.
4. Place tools, equipment and materials needed onto drop cloth.
5. Adequately wet both sides of area to be drilled using garden sprayer with amended water. Keep water away from any electrical cords or equipment.
6. Drill hole using hand drill or power drill with operating HEPA vacuum attached. Wet drilling area using amended water.

   As options, the following wetting methods/controls may be used:
   A. For small holes, a wet sponge can be placed on both sides of the surface and the hole drilled through the sponges.
   B. A HEPA vacuum hose may be used near the bit of a non-HEPA equipped drill, and on the back side if accessible.
   C. Shaving cream can be sprayed on both sides of the drilling area to control dust and debris. Shaving cream must be wiped up and disposed of as ACM.
7. Wipe debris off drill using wet disposable towels and place towels into disposal bag.
8. If back side was enclosed, insert wand of garden sprayer with amended water into back side enclosure and wet dust or debris. Remove back side enclosure and place into disposal bag. Wet wipe surfaces that were exposed inside back side enclosure.
9. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M14 . Level 3

Cut or drill asbestos cement panels.

Example Level 3: A. Cut or drill asbestos cement panel to install a vent through panel using power tools.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Hand or power drill as needed (power tools should have a HEPA vacuum attachment)
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9. If accessible, enclose back side of panel to catch dust and debris where hole will penetrate through panel.
4. Place tools, equipment and materials needed into enclosure.
5. Enter enclosure and adequately wet both sides of area to be cut or drilled using garden sprayer with amended water. Keep water away from any electrical cords or equipment.
6. Cut or drill hole(s) using saw or drill. Power tools should have an operating HEPA vacuum attached. Wet cutting area during drilling or cutting using amended water.

   As options, the following wetting methods/controls may be used:

   A. For small holes, a wet sponge can be placed on both sides of the surface and the hole drilled through the sponges.
   B. A HEPA vacuum hose may be used near the bit of a non-HEPA equipped drill, and on the back side if accessible.
   C. Shaving cream can be sprayed on both sides of the drilling area to control dust and debris. Shaving cream must be wiped up and disposed of as ACM.
7. Remove panel piece and wet wipe debris off drill or saw using wet disposable towels and place towels and debris into disposal bag.
8. If back side was enclosed, insert wand of garden sprayer with amended water into back side enclosure and wet dust or debris. Remove back side enclosure and place into disposal bag. Wet wipe surfaces that were exposed inside back side enclosure.
9. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

M15 . Summary

Remove asbestos cement panels.

Summary This work practice covers the procedures for removing a small number of asbestos cement panels to support O&M work. This procedure can be used for asbestos cement range hoods.

Examples

Level 1:	A.	Remove corrugated or flat asbestos cement panels that are painted or in good condition, and have fasteners that can be easily removed.
Level 2:	A.	Remove corrugated or flat asbestos cement panels in fair condition.
Level 3:	A.	Remove corrugated or flat asbestos cement panels in poor condition which have become friable and where dust or powder may be generated during removal.

Related Work Practices

M14 - Cut or drill asbestos cement panels.
M18 - Remove asbestos-containing fire door.

Worker Recommendations

One worker for Level 1 and Level 2. Two workers for Level 3. Panel size may necessitate two or more workers. A person with air monitoring training might be required. This person can be a worker.

M15 . Level 1

Remove asbestos cement panels.

Example Level 1: A. Remove corrugated or flat asbestos cement panels that are painted or in good condition, and have fasteners that can be easily removed.

Notes This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Tools as needed to remove panel fasteners (slatter's ripper, nail clipper, screwdriver)
3. Place tools, equipment and materials needed in work area.
4. Adequately wet panels to be removed with amended water. Remove fasteners holding panel in place. Clean fasteners if they are to be reused. Dispose of fasteners as ACM if not being reused.
5. Remove panel and wrap in two (2) layers of polyethylene sheet for disposal as ACM.
6. Perform maintenance work and clean-up and tear-down steps on Level 1 checklist to complete work.

M15 . Level 2

Remove asbestos cement panels.

Example Level 2: A. Remove corrugated or flat cement asbestos panels in fair condition.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

If activated electrical equipment is in work area, delete wetting (if permitted by EPA) for this work.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Tools as needed to remove panel fasteners (slatter's ripper, nail clipper, screwdriver)
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Adequately wet panel(s) to be removed using garden sprayer with amended water.
6. Remove fasteners holding panel in place. HEPA vacuum and wet fasteners as they are removed. Clean fasteners using water if they are to be reused. Dispose of fasteners as ACM if not being reused.
7. Remove panel and wrap in two (2) layers of polyethylene sheet for disposal as ACM.
8. HEPA vacuum and wet wipe surfaces to which panel was attached. HEPA vacuum and wet wipe up any dust or debris from panel removal.
9. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M15 . Level 3

Remove asbestos cement panels.

Example Level 3: A. Remove corrugated or flat asbestos cement panels in poor condition which have become friable and where dust or powder may be generated during removal.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

If activated electrical equipment is in work area, delete wetting (if permitted by EPA) for this work.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Tools as needed to remove panel fasteners (slatter's ripper, nail clipper, screwdriver)
3. Prepare work area with drop cloth, mini-enclosure and set up negative pressure system. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure.
5. Enter enclosure and adequately wet panel(s) to be removed using garden sprayer with amended water.
6. Remove fasteners holding panel in place. HEPA vacuum and wet fasteners as they are removed. Clean fasteners using water if they are to be reused. Dispose of fasteners as ACM if not being reused.
7. Remove panel and wrap in two (2) layers of polyethylene sheet for disposal as ACM. If panel breaks or chips and small debris results from removal, collect and dispose of in disposal bags or containers.
8. HEPA vacuum and wet wipe surfaces to which panel was attached. HEPA vacuum and wet wipe up any dust or debris from panel removal.
9. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

M16 . Summary

Remove cement asbestos cooling towers louvers.

Summary This work practice covers the procedures for asbestos cement cooling tower louvers.

Examples

Level 1:	A.	Remove asbestos cement cooling tower louvers in good condition.
Level 2:	A.	Remove asbestos cement cooling tower louvers in poor condition, abraded or severely weathered.

Related Work Practices

M15 - Remove asbestos cement panels.

Worker Recommendations

One worker. Two or more for large panels or elevated work areas. A person with air monitoring training might be required. This person may be a worker.

M16 . Level 1

Remove asbestos cement cooling tower louvers.

Example Level 1: A. Remove asbestos cement cooling tower louvers in good condition.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Tools as needed to remove louvers
   - Non-asbestos replacement louvers
3. Place tools, equipment and materials needed in work area. Verify that cooling tower is shut off and locked out.
4. Remove any fasteners holding louvers in place. HEPA vacuum and wet fasteners during removal. Clean fasteners for reuse or dispose of as ACM.
5. Remove louvers and place into disposal bags or wrap in polyethylene sheet for disposal.
6. HEPA vacuum surfaces louvers were contacting and any dust or debris from louver removal.
7. Perform maintenance work and clean-up and tear-down steps on Level 1 checklist to complete work.

M16 . Level 2

Remove asbestos cement cooling tower louvers.

Example Level 2: A. Remove asbestos cement cooling tower louvers in poor condition.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Tools as needed to remove louvers
   Non-asbestos replacement louvers
3. Prepare work area with drop cloth. Verify that cooling tower is shut off and locked out. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Adequately wet louvers to be removed.
6. Remove any fasteners holding louvers in place. HEPA vacuum and wet fasteners during removal. Clean fasteners for reuse or dispose of as ACM.
7. Remove louvers and place into disposal bags or wrap in polyethylene sheet for disposal. Collect any large broken pieces or chips and place into disposal bags.
8. HEPA vacuum and wet wipe surfaces that louvers were contacting. HEPA vacuum and wet wipe up any debris or dust from louver removal.
9. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M17 . Summary

Remove or replace asbestos cement roof shingles.

Summary This work practice covers the procedures for removing or replacing a small number of asbestos cement shingles from the roof of a building to support O&M work.

Examples

Level 1: A. Replace or remove a small number of asbestos cement roof shingles in good condition that are loose or can be removed with minimal breakage to perform patching, repair work, or install new vent or stack.

Level 2: A. Replace or remove asbestos cement roof shingles that are damaged and may become friable during removal.

Related Work Practices

M14 - Cut or drill asbestos cement panels.
M15 - Remove asbestos cement panels.
M18 - Remove and replace asbestos cement siding.
M22 - Remove asbestos-containing built-up roofing.

Worker Recommendations

One worker is usually sufficient. Two or more workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

M17 . Level 1

Remove or replace asbestos cement roof shingles.

Example Level 1: A. Replace or remove a small number of asbestos cement roof shingles in good condition that are loose or can be removed with minimal breakage to perform patching, repair work, or install new vent or stack.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Use of a safety harness is strongly recommended for working on sloped roofs. Roofing removal work shall be completed before any penetrations are made in the roof deck.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Pry bars, slatter's ripper and/or nail clipper
   - Non-slip boots for roofing work
   - Safety harness
   - Replacement roofing
   - Hammer
   - Spray encapsulant (if used)
3. Place tools, equipment and materials needed in work area. If desired, spray encapsulant on shingles prior to start of removal.
4. Starting at top of removal area, remove nails, cut nails or pry up edge of first shingle until edges can be gripped by hand. Remove shingle and place into disposal bags or polyethylene lined cardboard boxes and lower to ground level.
5. Continue removing shingles using procedures in step 4.
6. Clean up any debris or dust using wet wiping or HEPA vacuum.
7. Perform maintenance work and clean-up and tear-down steps on Level 1 checklist to complete work.

M17 . Level 2

Remove or replace asbestos cement roof shingles.

Example Level 2: A. Replace or remove asbestos cement roof shingles that are damaged and may become friable during removal.

Notes

This work practice must be used in conjunction with General Procedures **W1, W4, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Use of a safety harness is strongly recommended for working on sloped roofs. Roofing removal work shall be completed before any penetrations are made in the roof deck.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Pry bars, slatter's ripper and/or nail clipper
   - Non-slip boots for roofing work
   - Safety harness
   - Replacement roofing
   - Hammer
   - Spray encapsulant (if used)
3. Prepare work area with barrier tape and drop cloth. See General Procedures W4 and W9. Drop cloth should be below removal area to catch any debris generated during removal. Seal any roof penetrations, air intakes or windows in work area with polyethylene. Do not seal over plumbing vent stacks.
4. Place tools, equipment and materials needed into work area.
5. If feasible, safe and desired, encapsulate or adequately wet shingles to be removed.
6. Starting at top of removal area, remove nails, cut nails or pry up edge of first shingle until edges can be gripped by hand. Spray amended water on back of shingle. Remove shingle and place into disposal bags or polyethylene lined cardboard boxes.
7. Continue removing shingles using procedures in step 6.
8. Clean up any debris or dust using HEPA vacuuming and wet wiping.
9. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M18 . Summary

Remove and replace asbestos-cement siding shingles.

Summary This work practice covers the procedures for removing small amounts of asbestos cement siding shingles from the exterior of a building to support O&M work.

Examples

Level 1: A. Replace or remove a small number of asbestos cement siding shingles in good condition that are loose or can be removed with minimal breakage to perform patching, repair work, or to install a new window or door.

Level 2: A. Replace or remove asbestos cement siding shingles that are sufficiently damaged and may become friable during removal.

Related Work Practices

M14 - Cut or drill asbestos cement panels.
M15 - Remove cement asbestos panels.
M17 - Remove and replace asbestos cement shingles.
M22 - Remove asbestos-containing built-up roofing.

Worker Recommendations

One worker is usually sufficient. Two or more workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

M18 . Level 1

Remove and replace asbestos-cement siding shingles.

Example Level 1: A. Replace or remove a small number of asbestos cement siding shingles in good condition that are loose or can be removed with minimal breakage to perform patching, repair work, or to install a new window or door.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Pry bars, slatter's ripper and/or nail clipper
   - Replacement siding, if required
   - Spray encapsulant (if used)
3. Place tools, equipment and materials needed in work area and set up ladder or scaffold if needed. If desired, spray encapsulant on siding panels.
4. Starting at top of removal area, remove nails, cut nails or pry up edge of first panel until edges can be gripped by hand. Remove panel and place into disposal bags or polyethylene lined cardboard boxes and lower to ground level.
5. Continue removing panels using procedures in step 4.
6. Clean up any debris or dust using wet wiping or HEPA vacuum.
7. Perform maintenance work and clean-up and tear-down steps on Level 1 checklist to complete work.

M18 . Level 2

Remove and replace asbestos cement siding shingles.

Example Level 2: A. Replace or remove asbestos cement siding shingles that are sufficiently damaged and may become friable during removal.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Pry bars, slatter's ripper and/or nail clipper
   - Replacement siding, if required
   - Spray encapsulant (if used)
3. Prepare work area with drop cloth. See General Procedure W9. Drop cloth should be below removal area to catch any debris generated during removal. Set up ladder or scaffold if needed. Seal over any penetrations, air intakes or windows in work area with polyethylene. Do not cover over exhaust vents.
4. Place tools, equipment and materials needed onto drop cloth.
5. Apply spray encapsulant, to or adequately wet siding to be removed.
6. Starting at top of removal area, remove nails, cut nails or pry up edge of first panel until edges can be gripped by hand. Spray amended water on back of panel. Remove panel and place into disposal bags or polyethylene lined cardboard boxes and lower to ground level.
7. Continue removing panels using procedures in step 6.
8. Clean up any debris or dust using HEPA vacuuming and wet wiping.
9. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M19 . Summary

Remove high-temperature resistant (HTR) asbestos cement panels.

Summary This work practice covers the procedures for removing small amounts of high temperature resistant asbestos panels for maintenance work. These panels typically have a high asbestos content.

Examples

Level 1:	A.	Remove HTR asbestos cement panels in good condition that can be removed with minimal breakage.
Level 2:	A.	Remove HTR asbestos cement panels that are damaged and may become friable during removal.
Level 3:	A.	Remove HTR asbestos cement panels in poor and friable condition inside a mini-enclosure.

Related Work Practices

M14 - Cut or drill asbestos cement panels.
M15 - Remove asbestos cement panels.
M17 - Remove and replace asbestos cement shingles.
M22 - Remove asbestos-containing built-up roofing.

Worker Recommendations

One worker for Level 1 work. One or two workers for Level 2 depending upon safety and efficiency considerations. Two workers for Level 3. A person with air monitoring training might be required. This person can be a worker.

M19 . Level 1

Remove high temperature resistant (HTR) asbestos cement panels.

Example Level 1: A. Remove HTR asbestos cement panels in good condition that can be removed with minimal breakage.

Notes This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Tools needed to remove panels and fasteners
   - Spray encapsulant (if used)
3. Place tools, equipment and materials needed in work area and set up ladder or scaffold if needed. If desired, spray amended water or encapsulant on panels before starting removal.
4. Remove fasteners securing panels in place. Wet fasteners during removal. Remove panels and place into disposal bags or wrap in polyethylene.
5. Clean up any debris or dust using wet wiping or HEPA vacuum.
6. Perform maintenance work and clean-up and tear-down steps on Level 1 checklist to complete work.

M19 . Level 2

Remove high temperature resistant (HTR) asbestos cement panels.

Example Level 2: A. Remove HTR asbestos cement panels that are damaged and may become friable during removal.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Tools needed to remove panels and fasteners
   Spray encapsulant (if used)
3. Prepare work area with drop cloth. See General Procedure W9. Drop cloth should be below removal area to catch any debris generated during removal. Set up ladder or scaffold if needed.
4. Place tools, equipment and materials needed onto drop cloth.
5. Adequately wet panels to be removed using spray encapsulant or amended water.
6. Remove fasteners securing panels in place. Wet or HEPA vacuum fasteners during removal. Pull panel away slightly, spray amended water on back of panel, remove panel and place into disposal bags or wrap in polyethylene.
7. Clean up any debris or dust using HEPA vacuuming and wet wiping.
8. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M19 . Level 3

Remove high temperature resistant (HTR) asbestos cement panels.

Example Level 3: A. Remove HTR asbestos cement panels in poor and friable condition inside a mini-enclosure.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Tools needed to remove panels and fasteners
   Spray encapsulant (if used)
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure. Set up ladder or scaffold if needed.
5. Enter enclosure and adequately wet panels to be removed using spray encapsulant or amended water.
6. Remove fasteners holding panels in place. Wet or HEPA vacuum fasteners during removal. Pull panel away slightly, spray amended water on back of panel, remove panel and place into disposal bags or polyethylene lined cardboard boxes. Spray any loose or broken panel pieces with amended water and place into disposal bags.
7. Clean up any debris or dust using HEPA vacuuming and wet wiping.
8. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

M20 . Summary

Remove asbestos-containing chalk board.

Summary This work practice describes the work required to remove a chalkboard that is made of asbestos-containing material.

Examples

Level 1:	A.	Remove asbestos-containing chalkboard that is non-adhered and easily removed.
Level 2:	A.	Remove asbestos-containing chalkboard that is adhered or may generate minor debris from removal.
Level 3:	A.	Remove asbestos-containing chalkboard that is in poor condition or strongly adhered to wall.

Related Work Practices

None

Worker Recommendations

One worker for small boards or mechanically attached units. Two workers for larger boards or adhered units. A person with air monitoring training might be required. This person can be a worker.

M20 . Level 1

Remove asbestos-containing chalk board.

Example Level 1: A. Remove asbestos-containing chalkboard that is non-adhered and easily removed.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
3. Place tools, equipment and materials needed in work area.
4. Adequately wet chalkboard unit using garden sprayer with amended water. Spray water around sides of board and at joint between wall and top of board to wet any debris behind board.
5. Remove any fasteners or moldings attaching board to wall and remove board. Some boards lift up out of a supporting tray or off of supporting clips to remove. Wrap board in two layers of polyethylene sheet for disposal. If board is adhered to wall, a Level 2 or 3 procedure should be performed.
6. HEPA vacuum surface that board was attached to.
7. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

M20 . Level 2

Remove asbestos-containing chalk board.

Example Level 2: A. Remove asbestos-containing chalkboard that is adhered or may generate minor debris from removal.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
   - Crow bar and screwdrivers
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Adequately wet chalkboard unit using garden sprayer with amended water. Spray water around sides of board and at joint between wall and top of board to wet any debris behind board.
6. Remove any fasteners or moldings attaching board to wall and remove board. Some boards lift up out of a supporting tray or off of supporting clips to remove. If board is adhered to wall, use screwdrivers or crow bar to remove board. Wet adhesive (using amended water) while prying board off wall. Wrap board in two layers of polyethylene sheet for disposal.
7. If board was attached with adhesive, wet and scrape remaining adhesive off wall.
8. Wet wipe and HEPA vacuum surface that board was attached to.
9. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

M20 . Level 3

Remove asbestos-containing chalk board.

Example Level 3: A. Remove asbestos-containing chalkboard that is in poor condition or strongly adhered to wall.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
   - Crow bar and screwdrivers
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system. See General Procedure W9. Enclosure must be large enough to lay board on floor and wrap for disposal.
4. Place tools, equipment and materials needed into enclosure.
5. Enter enclosure and adequately wet chalkboard unit using garden sprayer with amended water. Spray water around sides of board and at joint between wall and top of board to wet any debris behind board.
6. Remove any fasteners or moldings attaching board to wall and remove board. Some boards lift up out of a supporting tray or off of supporting clips to remove. If board is adhered to wall use screwdrivers or crow bar to remove board. Wet adhesive using amended water while prying board off wall. Wrap board in two layers of polyethylene sheet for disposal.
7. If board was attached with adhesive, wet and scrape remaining adhesive off wall.
8. Wet wipe and HEPA vacuum surface that board was attached to.
9. Perform clean-up and tear-down steps on Level 3 checklist to complete work.

M21 . Summary

Remove asbestos-containing fire door and/or door hardware.

Summary This procedure sets forth the O&M work procedures to remove an asbestos-containing fire door or door hardware in an asbestos-containing fire door. Cutting or drilling into asbestos containing doors are included as Level 3 work.

Examples

Level 1:
- A. Remove asbestos-containing fire door that is in good condition for replacement.
- B. Replace lockset or closer on asbestos-containing fire door in good condition. Lockset does not penetrate asbestos core of door.

Level 2:
- A. Remove asbestos-containing fire door that is damaged.
- B. Replace lockset or closer on asbestos-containing fire door in poor condition. Lockset may penetrate asbestos core of door.

Level 3:
- A. Cut a door to install new window.
- B. Drill hole for new lockset through asbestos core of door.

Related Work Practices

None

Worker Recommendations

One worker for Level 1 and Level 2. Two workers may facilitate handling of heavy doors being removed. Two workers for Level 3. A person with air monitoring training might be required. This person can be a worker.

M21 . Level 1

Remove asbestos-containing fire door and/or door hardware.

Examples Level 1:

A. Remove asbestos-containing fire door that is in good condition for replacement.

B. Replace lockset or closer on asbestos-containing fire door in good condition. Lockset does not penetrate asbestos core of door.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Screwdriver and tools needed for hardware or door removal
3. Place tools, equipment and materials needed in work area.
4. If door is equipped with a closer, detach closer arm from door frame. Remove screws attaching closer to door. HEPA vacuum or wet clean screws, closer, and area where closer was attached to door. Thoroughly clean closer and parts if they will be re-used. If closer will not be re-used, dispose of as ACM waste.
5. Remove lockset from door using procedures used for closer. HEPA or wet wipe vacuum lockset if it will be re-used or dispose of as ACM waste.
6. Lay two layers of polyethylene sheet on floor for wrapping door.
7. Remove hinge pins or screws attaching hinges to door frame. Lay door on polyethylene.
8. If hinges are to be re-used, remove from door following procedures used for closer. If hinges are to be disposed of, leave hinges attached to door.
9. Wrap door for disposal.
10. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

M21 . Level 2

Remove asbestos-containing fire door and/or door hardware.

Examples Level 2:

A. Remove asbestos-containing fire door that is damaged.

B. Replace lockset or closer on asbestos-containing fire door in poor condition. Lockset may penetrate asbestos core of door.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Screwdrivers and tools needed for hardware and door removal
3. Prepare work area with drop cloth. See General Procedures.
4. Place tools, equipment and materials needed on drop cloth.
5. Wet any damaged areas with amended water.
6. If door is equipped with a closer, detach closer arm from door frame. Wet closer and area where closer is attached to door using amended water. Remove screws attaching closer to door. Wet screws during removal and area behind closer once all screws are removed. HEPA vacuum and wet wipe closer and screws if it is to be re-used. If closer and screws will not be re-used, dispose of as ACM waste.
7. Remove lockset from door using procedures used for closer. HEPA vacuum lockset if it will be re-used or dispose of as ACM waste.
8. Lay two layers of polyethylene sheet on floor for wrapping door.
9. Remove hinge pins or screws attaching hinges to door frame. Lay door on polyethylene.
10. If hinges are to be re-used, remove from door following procedures used for closer. If hinges are to be disposed of, leave hinges attached to door.
11. Wrap door for disposal.
12. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

M21 . Level 3

Remove asbestos-containing fire door and/or door hardware.

Examples Level 3:

A. Cut a door to install new window.
B. Drill hole for new lockset through asbestos core of door.

Notes

This work practice must be used in conjunction with General Procedures **W1**, **W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Tools needed to cut or drill door, with HEPA filtered dust collection attachment if possible.
   New lockset or window
3. Prepare work area with drop, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9. Enclosures can be installed at door location, or door can be removed and taken into an enclosure.
4. Place tools, equipment and materials needed into enclosure.
5. Wet area where hole will be cut or drilled.
6. Cut or drill door as required. Wet cutting or drilling location during work.
7. Place cut piece of door or debris from drilling into ACM disposal bags. HEPA vacuum or wet wipe new hole area and clean up any debris.
8. Install window or lockset and perform clean-up and tear-down steps on Level 3 checklist to complete work.

M22 . Summary

Remove asbestos-containing built-up roofing.

Summary This work practice explains the work required to remove a small amount of asbestos-containing built-up roofing or flashing for maintenance or repair work.

Examples

Level 1:	A.	Remove small section of damaged asbestos-containing built-up roofing to perform patching, repair or install equipment.
Level 2:	A.	Remove small section of asbestos-containing built-up roofing which is damaged to the extent that it has become friable.

Related Work Practices

M17 - Remove and replace asbestos cement roof shingles.
M23 - Remove asbestos-containing asphalt shingles.

Worker Recommendations

One worker is usually sufficient. Two or more workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

M22 . Level 1

Remove asbestos-containing built-up roofing.

Example Level 1: A. Remove small section of damaged asbestos-containing built-up roofing to perform patching, repair or install equipment.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Use fall prevention measures (including safety harnesses, a warning line system with safety monitor, and/or a motion stopping system) as required by OSHA for roofing work. Roofing removal work shall be completed before any penetrations through the roof deck are made. Coordinate work with O & M Work Practice S7 if surfacing is present on underside of deck.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Safety harness/warning line system and/or motion stopping system
   - Hook knife
   - Garden sprayer with amended water
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Replacement roofing materials and tools
   - Rope for lowering bags
3. Place tools, equipment and materials needed in work area. If feasible and safe, adequately wet roofing to be removed. The use of wetting and amended water for roofing work should limited for the following reasons:
   A. Wet roofing can create slip hazards
   B. Roofing mastic/cool tar/bitumen will not adhere to wet surfaces.
   C. Water can damage materials below the roof membrane.
   However, regulations (such as NESHAP) require that RACM be adequately wet in disposal bags or containers.
4. Cut around area to be removed using hand tools. Note that several layers may be present.
5. Scrape up roofing and place into disposal bags. Remove any remaining roofing debris in removal area using scraper and place into disposed bags. Lower bags to ground.
6. HEPA vacuum or wet wipe removal area. Use HEPA vacuum where needed to clean up ACM. It may not be appropriate or necessary to use HEPA vacuum on non-ACM.

7. Perform maintenance/repair work and clean-up and tear-down steps on Level 1 checklist to complete work.

M22 . Level 2

Remove asbestos-containing built-up roofing.

Example Level 2: A. Remove small section of asbestos-containing built-up roofing which is damaged to the extent that it has become friable.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Use fall prevention measures (including safety harnesses, a warning line system with safety monitor, and/or a motion stopping system) as required by OSHA for roofing work. Roofing removal work shall be completed before any penetrations through the roof deck are made. Coordinate work with O & M Work Practice S7 if surfacing ACM is present on underside of deck.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Safety harness/warning line system and/or motion stopping system
   - Hook knife
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Replacement roofing materials and tools
   - Rope for lowering bags
3. Prepare work area with barrier tape and seal any windows, HVAC units, air intakes or other openings that could allow fibers from work area into building - See General Procedure W4. Do not seal any plumbing vents in work area.
4. Place tools, equipment and materials needed in work area.
5. If feasible and safe, adequately wet roofing to be removed using garden sprayer with amended water. The use of wetting and amended water for roofing work should limited for the following reasons:
   A. Wet roofing can create slip hazards.
   B. Roofing mastic/cool tar/bituman will not adhere to wet surfaces.
   C. Water can damage materials below the roof membrane.

   However, regulations (such as NESHAP) require that RACM be adequately wet in disposal bags or containers.
6. Cut around area to be removed using hand tools. Wet cutting area using amended water. Note that several layers may be present.
7. Scrape up roofing section and place into disposal bags. Wet and remove any roofing debris in removal area using scraper. Lower bags to ground.
8. HEPA vacuum or wet wipe removal area. Use HEPA vacuum where needed to clean up ACM. It may not be appropriate or necessary to use HEPA vacuum on non-ACM.
9. Perform maintenance/repair work and clean-up and tear-down steps on Level 2 checklist to complete work.

M23 . Summary

Remove asbestos-containing asphalt shingles.

Summary This work practice describes the work required to remove a small number of asbestos-containing shingles for maintenance or repair work.

Examples

Level 1:	A.	Remove asbestos-containing asphalt shingles to install a new vent stack.
Level 2:	A.	Remove asbestos-containing asphalt shingles in poor condition to repair roof leak. Shingles are damaged to the extent that they have become friable.

Related Work Practices

M17 - Remove and replace asbestos cement roof shingles.
M22 - Remove asbestos-containing built-up roofing.

Worker Recommendations

One worker is usually sufficient. Two or more workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

M23 . Level 1

Remove asbestos-containing asphalt shingles.

Example Level 1: A. Remove asbestos-containing asphalt shingles to install a new vent stack.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Use fall prevention measures (including safety harnesses, a warning line system with safety monitor, and/or a motion stopping system) as required by OSHA for roofing work. Roofing removal work shall be completed before any penetrations are made in the roof deck.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Garden sprayer with amended water
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Roofing repair materials (shingles, roofing cement, nails)
   - Hammer
   - Pry bar
   - Safety harness/warning line system and/or motion stopping system
   - Non-slip boots
   - Spray encapsulant (if used)
3. Place tools, equipment and materials needed in work area. If feasible and safe, adequately wet shingles to be removed with amended water or encapsulant. The use of wetting and amended water for roofing work should limited for the following reasons:
   - A. Wet roofing can create slip hazards.
   - B. Roofing mastic/cool tar/bituman will not adhere to wet surfaces.
   - C. Water can damage materials below the roof membrane.

   However, regulations (such as NESHAP) require that RACM be adequately wet in disposal bags or containers.
4. Slide scraper under bottom shingle and twist scraper to break shingle seal. Remove entire shingle or sections of 3-Tab type shingles. Perimeter of removal area must have clean, straight vertical cuts to allow installation of new shingles. Note that several layers may be present.
5. Continue removing shingles one at a time following the steps used for the first shingle until area needed is removed. Place all shingles into disposal bags.
6. Pry up tabs on shingles immediately above removal area to facilitate installing new shingles.

7. HEPA vacuum or wet wipe removal area. Use HEPA vacuum where needed to clean up ACM. Do not use HEPA vacuum on fibrous non-asbestos containing materials (such as fiberglass roof insulation) unless necessary.
8. Perform maintenance work and clean-up and tear-down steps on Level 1 checklist to complete work. Use roofing cement on tabs of existing shingles to seal them to new shingles.

M23 . Level 2

Remove asbestos-containing asphalt shingles.

Example Level 2: A. Remove asbestos-containing asphalt shingles in poor condition to repair roof leak. Shingles are damaged to the extent that they have become friable.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Use fall prevention measures (including safety harnesses, a warning line system with safety monitor, and/or a motion stopping system) as required by OSHA for roofing work. Roofing removal work shall be completed before any penetrations are made in the roof leak.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Roofing repair materials (shingles, roofing cement, nails)
   - Hammer
   - Pry bar
   - Safety harness/warning line system and/or motion stopping system
   - Non-slip boots
   - Spray encapsulant (if used)
3. Prepare work area with barrier tape and seal over any windows, HVAC units, air intakes or other openings that could allow fibers from work area into building. See General Procedure W4. Do not seal over any plumbing vents in work area.
4. Place tools, equipment and materials needed in work area.
5. If feasible and safe, adequately wet area of shingles to be removed with amended water or encapsulant. The use of wetting and amended water for roofing work should be limited for the following reasons:
   A. Wet roofing can create slip hazards.
   B. Roofing mastic/cool tar/bituman will not adhere to wet surfaces.
   C. Water can damage materials below the roof membrane.

   However, regulations (such as NESHAP) require that RACM be adequately wet in disposal bags or containers.
6. Slide scraper under bottom shingle and twist scraper to break shingle seal. Remove entire shingle or sections of 3-Tab type shingles. Wet underside of shingles as they are removed. Perimeter of removal area must have clean, straight vertical cuts to allow installation of new shingles. Note that several layers may be present.

7. Continue removing shingles one at a time following the steps used for the first shingle until area needed is removed. Place all shingles into disposal bags.
8. Pry up tabs on shingles immediately above removal area to facilitate installing new shingles.
9. HEPA vacuum or wet wipe removal area. Use HEPA vacuum where needed to clean up ACM. It may not be appropriate or necessary to use HEPA vacuum on non-ACM.
10. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work. Use roofing cement on tabs of existing shingles to seal them to new shingles.

M24 . Summary

Cut or drill asbestos-containing drywall, plaster or drywall compound.

Summary This work practice covers the procedures for cutting or drilling of asbestos-containing drywall or plaster. Joint compounds and tape are also covered by this procedure.

Examples

Level 2:

A. Install new electrical receptacle or ceiling junction box in asbestos-containing drywall or plaster using hand tools.

B. Drill holes to attach conduit to asbestos-containing drywall or plaster using non-powered hand tools.

C. Drill holes in asbestos-containing joint compound where drywall or plaster is non-asbestos.

Level 3:

A. Install conduit or ductwork through asbestos-containing drywall or plaster using power tools.

Related Work Practices

M14 - Cut or drill asbestos cement panels.
M15 - Remove asbestos cement panels.

Worker Recommendations

One worker is usually sufficient for Level 2. Two workers for Level 3. Two workers may be needed to increase efficiency or for additional health and/or safety considerations. Workers should be trained in working with drywall and asbestos. A person with air monitoring training might be required. This person can be a worker.

M24 . Level 2

Cut or drill asbestos-containing drywall, plaster or drywall compound.

Examples Level 2:

A. Install new electrical receptacle or ceiling junction box in asbestos-containing drywall or plaster using hand tools.

B. Drill holes to attach conduit to asbestos-containing drywall or plaster using non-powered hand tools.

C. Drill holes in asbestos-containing joint compound where drywall or plaster is non-asbestos.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

It is important that this work practice be validated to determine if it provides the desired degree of worker and environmental protection. Level 3 might be necessary to perform this activity. Appendix G to OSHA regulation 29 CFR 1926.58 states: "The training program for the maintenance engineering staff should describe methods of handling asbestos-containing materials as well as routine maintenance activities that are prohibited when asbestos-containing materials are involved. For example, maintenance staff employees should be instructed: Not to drill holes in asbestos-containing materials".

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Hand drill or hole saw (as needed). Power tools should have HEPA filtered dust collection
   - Maintenance work materials
   - Wet sponges or shaving cream (if used)
3. Prepare work area with drop cloth. See General Procedure W9. If accessible, also install a drop cloth on back side of drywall if hole(s) will penetrate through wall.
4. Place tools, equipment and materials needed onto drop cloth.
5. Mark area to be cut or drilled.
6. Adequately wet area to be cut using garden sprayer with amended water. As alternate methods, holes can be drilled/cut through a wet sponge or shaving cream on both sides.
7. Cut new hole using utility knife, hand tools or power tools with HEPA filtered dust collection. Wet the cutting area using amended water during cutting or drilling.
8. Remove piece of cut drywall and place into disposal bag. If wet sponges were used, place sponges into disposal bag.

9. HEPA vacuum removal area and areas accessible from hole.
10. HEPA vacuum and wet wipe up any accessible dust or debris generated on back side. Wet wipe drop cloth and surfaces adjacent to area where hole was cut or drilled. Remove drop cloth and place into disposal bags.
11. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M24 . Level 3

Cut or drill asbestos-containing drywall, plaster or drywall compound.

Example Level 3: A. Install conduit or ductwork through asbestos-containing drywall or plaster using power tools.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Appendix G to OSHA regulation 29 CFR 1926.58 states: "The training program for the maintenance engineering staff should describe methods of handling asbestos-containing materials as well as routine maintenance activities that are prohibited when asbestos-containing materials are involved. For example, maintenance staff employees should be instructed: Not to drill holes in asbestos-containing materials."

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Drill or saw (as needed) with HEPA filtered dust collection attachment
   Maintenance work materials.
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9. If back side of drywall is accessible, enclose area if hole(s) will penetrate through wall. Provide negative air in backside enclosure if possible. A glovebag may be used as an enclosure for small work areas.
4. Place tools, equipment and materials needed into enclosure. Include a second HEPA vacuum for any power tools to be used for cutting or drilling.
5. Enter enclosure and mark area to be cut or drilled.
6. Adequately wet area to be cut using garden sprayer with amended water.
7. Cut new hole using utility knife, hole saw or drill. Power tools must have an operating HEPA vacuum attached during cutting. Wet the cutting area using amended water during cutting or drilling.
8. Remove piece of cut drywall and place into disposal bag.
9. HEPA vacuum removal area and areas accessible from hole.
10. If dust or debris is generated on back side, insert wand of garden sprayer into back side of enclosure and adequately wet any dust or debris present. Remove back-side enclosure, place into disposal bags, and wet wipe surfaces that were exposed inside enclosure.
11. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

M25 . Summary

Remove section of asbestos-containing drywall.

Summary

This work practice describes the work required to remove a small area of asbestos-containing drywall, or non-ACM drywall with ACM joint compound in support of O&M work.

Examples

Level 2: A. Remove small area of asbestos-containing drywall in good condition using non-powered hand tools. Low dust Level expected.

Level 3: A. Replace damaged section of asbestos-containing drywall or drywall adhered to studs using hand tools or power tools with HEPA vacuum dust collection attachments.

Related Work Practices

M24 - Cut or drill asbestos-containing drywall or drywall compound.

Worker Recommendations

One worker is usually sufficient for Level 2. Two workers for Level 3. Two or more workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

M25 . Level 2

Remove section of asbestos-containing drywall.

Example Level 2: A. Remove small area of asbestos-containing drywall in good condition using non-powered hand tools. Low dust Level expected.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Hand tools as needed
   - Pry bars
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Adequately wet entire area of drywall to be removed using garden sprayer with amended water.
6. Cut around perimeter of area to be removed using hand tools. Wet cutting area with amended water during cutting.
7. If drywall remains attached to studs or substrate, use pry bar to pull sheet out enough so edge can be gripped with hands. Mist cavity behind drywall and back side of drywall to be removed with amended water.
8. Pull sheet out so sheet folds at fastener line or sheet is pulled away from fasteners. Adequately wet fold or holes from fasteners.
9. Repeat step 8 at other attachment points, remove drywall piece, and package for disposal.
10. Remove fasteners from studs or substrate and place into disposal bags. Clean any debris left on studs or substrate using amended water and nylon brush.
11. Pick up any debris and place into disposal bags. HEPA vacuum and wet wipe up any dust generated.
12. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M25 . Level 3

Remove section of asbestos-containing drywall.

Example Level 3: A. Replace damaged section of asbestos-containing drywall or drywall adhered to studs using hand tools or power tools with HEPA vacuum dust collection attachments.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   Tools as needed
   Pry bars
3. Prepare regulated area with drop cloth, erect mini-enclosure and set up negative pressure system. See General Procedure W9. If back side of drywall is accessible, enclose and provide negative pressure for enclosure.
4. Place tools, equipment and materials needed into enclosure.
5. Enter enclosure and adequately wet area of drywall to be removed using garden sprayer with amended water.
6. Cut around perimeter of area to be removed using utility knife. Wet cutting area during cutting.
7. If drywall remains attached to studs or substrate, use pry bar to pull sheet out enough so edge can be gripped with hands. Mist cavity behind drywall, and back side of drywall to be removed with amended water.
8. Pull sheet out so sheet folds at fastener line or sheet is pulled away from fasteners. Adequately wet fold or holes from fasteners.
9. Repeat step 8 at other attachment points, remove drywall piece, and package for disposal.
10. Remove fasteners from studs or substrate and place into disposal bags. Clean any debris left on studs or substrate using amended water and nylon brush.
11. Pick up any debris and place into disposal bags. HEPA vacuum and wet wipe up any dust generated.
12. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

M26 . Summary

Remove asbestos-containing flexible duct connector.

Summary This work describes the work required to remove an asbestos-containing fabric flexible duct connector.

Examples

Level 1:	A.	Remove flexible duct connector with duct work.
	B.	Remove flexible duct connector in good condition where connector will not be damaged.
Level 2:	A.	Remove flexible duct connector where it may be damaged during removal.
Level 3:	A.	Remove flexible duct connector in poor condition.

Related Work Practices

T10 - Remove duct insulation above lay-in ceiling for maintenance work.
T11 - Remove duct insulation above plaster or drywall ceiling for maintenance work.
M28 - Remove contaminated filters in HVAC unit serving plenum space with exposed ACM.

Worker Recommendations

One worker for Level 1 and Level 2. Two workers for Level 3. A second worker may be needed for large connectors. A person with air monitoring training might be required. This person can be a worker.

M26 . Level 1

Remove asbestos-containing flexible duct connector.

Examples Level 1: A. Remove flexible duct connector with duct work.
B. Remove flexible duct connector in good condition where connector will not be damaged.

Notes

This work practice must be used in conjunction with General Procedure **W1, W4** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for removing duct insulation if needed to access fasteners attaching flexible connector in place.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
   - Manual or power screwdriver with screwdriver bits and hex head sockets
3. Turn off, lock out and tag out HVAC unit. Install critical barriers in ductwork or HVAC unit adjacent to both sides of flexible connector (if possible). See General Procedure W4.
4. Place tools, equipment and materials needed in work area.
5. A. If ductwork will be cut to remove connector, cover flexible connector with polyethylene on outside, and on inside, if accessible. If connector is in good condition, follow step 5B below. Cut away ductwork on both sides of connector and remove ductwork section with connector in place. Package connector for disposal as ACM.
   B. For connectors in good condition, unscrew all screws holding flexible connector in place. Place screws into a disposal bag if they will not be reused, or clean with water and nylon brushes for reuse. Slide connector off ductwork, pull out of space between ducts, and package for disposal as ACM.
6. HEPA vacuum interior of ducts accessible at both sides where connector was installed.
7. Remove critical barriers if installed inside ductwork or HVAC unit.
8. Perform maintenance work and clean-up and tear-down steps on Level 1 checklist to complete work.

M26 . Level 2

Remove asbestos-containing flexible duct connector.

Example Level 2: A. Remove flexible duct connector where it may be damaged during removal.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for removing duct insulation if needed to access fasteners attaching flexible connector in place.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
   - Manual or power screwdriver with screwdriver bits and hex head sockets
3. Prepare work area with drop cloth. See General Procedure W9. Also, install critical barriers in ductwork or HVAC unit adjacent to both sides of flexible connector (if possible).
4. Place tools, equipment and materials needed into work area.
5. Adequately wet flexible connector with amended water or removal encapsulant.
6. Unscrew all screws holding flexible connector in place. Place screws into disposal bag if they will not be reused. If screws are to be reused, clean with water and nylon brushes.
7. Rewet connector and metal flanges of flexible connector and slide off of ductwork. Pull connector out of space and package for disposal as ACM.
8. HEPA vacuum surfaces where flanges were attached and interior of ducts accessible at both sides where connector was installed.
9. Remove critical barriers if installed inside ductwork or HVAC unit.
10. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M26 . Level 3

Remove asbestos-containing flexible duct connector.

Example Level 3: A. Remove flexible duct connector in poor condition.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for removing duct insulation if needed to access fasteners attaching flexible connector in place.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
   - Manual or power screwdriver with screwdriver bits and hex head sockets
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. Enclosure must allow access to all screws attaching connector in place. See General Procedure W9. Also install critical barriers in ductwork or HVAC unit adjacent to both sides flexible connector to be removed (if possible).
4. Place tools, equipment and materials needed into enclosure.
5. Adequately wet flexible connector with amended water or removal encapsulant.
6. Unscrew all screws holding flexible connector in place. Place screws into disposal bag if they will not be reused. If screws are to be reused, clean with water and nylon brushes.
7. Rewet connector and metal flanges of flexible connector and slide off of ductwork. Pull connector out of space and package for disposal as ACM.
8. HEPA vacuum and wet wipe surfaces where flanges were attached and interior of ducts accessible at both sides where connector was installed.
9. Remove critical barriers if installed inside ductwork or HVAC unit.
10. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

M27 . Summary

Remove asbestos-containing ductwork taping cloth.

Summary This work practice covers the steps required to remove small amounts of asbestos-containing duct tape from ductwork for maintenance work.

Examples

Level 1:	A.	Remove ductwork taping cloth with duct section.
	B.	Remove loose pieces of ductwork taping cloth.
Level 2:	A.	Remove a small amount of ductwork taping cloth in good condition to install new duct attached to existing ducts.
Level 3:	A.	Replace damaged section of ductwork.
	B.	Remove asbestos-containing paper-type duct wrap in poor condition.

Related Work Practices

M26 - Remove asbestos-containing flexible duct connector.

Worker Recommendations

One worker is usually sufficient for Level 1 and Level 2. Two workers for Level 3. Two or more workers may be needed to increase efficiency or for additional health and/or safety considerations. A person with air monitoring training might be required. This person can be a worker.

M27 . Level 1

Remove asbestos-containing ductwork taping cloth.

Examples Level 1:

A. Remove ductwork taping cloth with duct section.
B. Remove loose pieces of ductwork taping cloth.

Notes

This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Tin snips
3. Place tools, equipment and materials needed in work area.
4. Using garden sprayer with amended water or removal encapsulant, adequately wet any loose pieces of taping cloth to be removed.
5. If taping cloth will be removed with duct section, follow step 5A. If loose pieces will be removed, follow step 5B.
   A. Cover taping cloth with duct tape or polyethylene taped in place. Using tin snips, cut away ductwork on both sides of connector (do not cut through taping cloth) and remove ductwork section. Package for disposal as ACM.
   B. Pick up wet pieces of taping cloth and place into disposal bag.
6. HEPA vacuum and/or wet wipe up any visible debris.
7. Perform maintenance work and clean-up and tear-down steps on Level 1 checklist to complete work.

M27 . Level 2

Remove asbestos-containing ductwork taping cloth.

Example Level 2: A. Remove a small amount of ductwork taping cloth in good condition to install new duct attached to existing ducts.

Notes This work practice must be used in conjunction with General Procedures **W1, W9, W17** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Tools and materials needed for duct work
   - Glovebags
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Insert tools needed into glovebag. Install glovebag over taping cloth to be removed.
6. Insert wand of garden sprayer with amended water or removal encapsulant into glovebag and adequately wet taping cloth to be removed.
7. Using scraper inside glovebag, remove taping cloth using glovebag procedures. See General Procedure W17. Wet removal area during removal.
8. Clean remaining visible debris off ductwork using scraper and nylon brushes.
9. HEPA vacuum and wet wipe area where tape was removed.
10. Seal and remove glovebags from ductwork and dispose of as ACM waste.
11. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M27 . Level 3

Remove asbestos-containing ductwork taping cloth.

Examples Level 3: A. Replace damaged section of ductwork.
B. Remove asbestos-containing paper-type duct wrap in poor condition.

Notes This work practice must be used in conjunction with General Procedures **W1, W9, W17** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Tools and materials needed for duct work
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
   - Glovebags
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure.
5. Enter enclosure and insert tools needed into glovebag. Install glovebag over taping cloth to be removed.
6. Insert wand of garden sprayer with amended water or removal encapsulant into glovebag (if used) and adequately wet ACM to be removed.
7. Using scraper, remove taping cloth using glovebag procedures. See General Procedure W17. Wet removal are during removal.
8. Clean remaining visible debris off ductwork using scraper and nylon brushes.
9. HEPA vacuum and wet wipe area where tape was removed.
10. Seal and remove glovebags from ductwork and dispose of as ACM waste.
11. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

M28 . Summary

Remove contaminated filters in HVAC unit serving plenum space with exposed ACM.

Summary This work practice covers the procedures for removing asbestos contaminated filters in HVAC unit serving plenum space with exposed ACM.

Examples Level 2:

A. Remove prefabricated slip-in type filters from HVAC unit in mechanical room.

B. Replace filters in HVAC unit in mechanical room with roll-type filters.

Related Work Practices

None

Worker Recommendations

One worker. A second worker may be needed for large, roll-type filters. A person with air monitoring training might be required. This person can be a worker.

M28 . Level 2

Remove contaminated filters in HVAC unit serving plenum space with exposed ACM.

Examples Level 2:

A. Remove prefabricated slip-in type filters from HVAC unit in mechanical room.

B. Replace filters in HVAC unit in mechanical room with roll-type filters.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist.** The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice for accessing type of ceiling present in work area. OSHA standard 29 CFR 1926.58 Appendix G states employees should be instructed to not remove ventilation system filters dry and not to shake ventilation system filters.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
   - Replacement filter material, if needed
3. Prepare work area with drop cloth. See General Procedure W9. Verify that HVAC unit is shut off and locked out.
4. Place tools, equipment and materials needed onto drop cloth.
5. Adequately wet filters to be removed.
6. Remove filters and dispose of as ACM. Cut away exposed portions of roll type filters, wrap in polyethylene sheet and dispose of as ACM.
7. Wet any dust or debris on drop cloth, and fold up drop cloth and dispose of as ACM.
8. HEPA vacuum and wet wipe area where filters were installed and accessible surfaces in filter chamber.
9. Roll new filter material into place and cover remaining filter material. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

M29 . Summary

Clean up debris from minor fiber release.

Summary This work practice describes the procedures to be used to clean up a minor fiber release generated by surfacing, TSI or miscellaneous ACM. If a major fiber release occurs, the APM or an asbestos designer should develop cleanup procedures for the particular location and circumstances. Some regulations, such as AHERA, define maximum quantities for this activity. Regulations may also require that a fiber release report be prepared and made available to affected personnel. If fiber release needs Level 3 work practices, it should be treated as an abatement project, not as O&M work.

Examples

Level 1:

A. Pick up small amount of ACM debris that will stick to a small piece of duct tape.

Level 2:

A. Clean up a small amount of debris from delaminated, abraded or damaged surfacing.

B. Clean up a small amount of debris from damaged pipe insulation.

C. Clean up a small amount of debris from damaged drywall.

Related Work Practices

S10 - Repair damaged surfacing ACM.
T7 - Repair damaged thermal system insulation on a boiler, duct or flue.

Worker Recommendations

One worker. A person with air monitoring training might be required. This person can be the worker.

M29 . Level 1

Clean up debris from minor fiber release.

Example Level 1: A. Clean up small amount of ACM debris that will stick to a small piece of duct tape.

Notes This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice to repair cause of fiber release if repair is necessary.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   None
3. Cover debris with duct tape and press to adhere debris to tape. Repeat with another piece of tape if needed. Dispose of tape as ACM or in accordance with applicable regulations.
4. Perform applicable steps on Level 1 checklist to complete work.

M29 . Level 2

Clean up debris from minor fiber release.

Examples Level 2:

A. Clean up a small amount of debris from delaminated, abraded or damaged surfacing.

B. Clean up a small amount of debris from damaged pipe insulation.

C. Clean up a small amount of debris from damaged drywall.

Notes

This work practice must be used in conjunction with General Procedures W1, W4 and a Level 2 Worker Checklist. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice to repair cause of fiber release.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Scraper 2-3" (50-75 mm) wide stiff blade
   Stiff nylon bristle brushes
3. Prepare work area with critical barriers. See General Procedure W4.
4. Place tools, equipment and materials needed into work area.
5. Adequately wet debris to be cleaned up using amended water.
6. Pick up any large pieces of debris and place into disposal bags. Use HEPA vacuum and wet wiping to clean up small debris and dust.
7. Wet wipe and HEPA vacuum all surfaces in contaminated area.
8. Perform any required repair work using appropriate work practice. Perform clean-up and tear-down steps on Level 2 checklist to complete work.

M30 . Summary

Replace asbestos-containing gaskets.

Summary This work practice describes the work required to replace ACM gaskets or ACM valve packings for O&M work.

Examples

Level 1:	A.	Replace small non-adhered gasket that can be removed intact.
Level 2:	A.	Replace small valve packing.
	B.	Replace gasket between two small or medium size pipe flanges.
	C.	Replace small damaged gasket.
Level 3:	A.	Replace large pipe flange gasket.
	B.	Replace gasket on boiler door.
	C.	Replace well-adhered gasket.

Related Work Practices

T1 - Remove insulation on exposed pipe for maintenance work.
T4 - Remove insulation on exposed pipe in elevated location for maintenance work.
T7 - Repair damaged thermal system insulation on a boiler, duct or flue.

Worker Recommendations

One worker for Level 1 and Level 2. Two workers for Level 3. A person with air monitoring training might be required. This person can be the worker.

M30 . Level 1

Replace asbestos-containing gaskets.

Example Level 1: A. Replace small non-adhered gasket that can be removed intact.

Notes This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice if other ACM must be removed prior to gasket replacement.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Tools required to access gasket
   - Non-ACM replacement materials
3. Place tools, equipment and materials needed in work area.
4. Disassemble equipment as needed to expose entire gasket.
5. Remove gasket and place into disposal bag. Wet-wipe flange where gasket was installed.
6. Install new gasket, reassemble equipment and perform applicable steps on Level 1 checklist to complete work.

M30 . Level 2

Replace asbestos-containing gaskets.

Examples Level 2:

A. Replace small valve packing.
B. Replace gasket between two small or medium size pipe flanges.
C. Replace small damaged gasket.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9, W17** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice if other ACM must be removed prior to gasket replacement. If active electrical equipment is in work area, delete wetting (if permitted by EPA) for this work.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
   - Tools required to access or remove gasket
   - Non-ACM replacement materials
   - Glovebag
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed into work area.
5. Disassemble equipment as needed to expose entire gasket.
6. A. If entire gasket can be contained in a glovebag, install glovebag over gasket. Adequately wet gasket and remove gasket and debris using glovebag procedures. See General Procedure W17.
   B. If gasket cannot be contained in a glovebag, adequately wet gasket, set up HEPA filtered local exhaust ventilation and remove gasket and debris. Use nylon brushes and scraper to clean surfaces to which gasket was attached.
7. HEPA vacuum and/or wet wipe surfaces to which gasket was attached.
8. Install new gasket, reassemble equipment and perform clean-up and tear-down steps on Level 2 checklist to complete work.

M30 . Level 3

Replace asbestos-containing gaskets.

Examples Level 3:

A. Replace large pipe flange gasket.
B. Replace gasket on boiler door.
C. Replace well-adhered gasket.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9, W17** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Coordinate work with proper O & M work practice if other ACM must be removed prior to gasket replacement. If active electrical equipment is in work area, delete wetting (if permitted by EPA) for this work.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
   - Tools required to access or remove gasket
   - Non-ACM replacement materials
   - Glovebag
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure.
5. Enter enclosure and disassemble equipment as needed to expose entire gasket.
6. A. If entire gasket can be contained in a glovebag, install glovebag over gasket. Adequately wet gasket and remove gasket and debris using glovebag procedures. See General Procedure W17.
   B. If gasket cannot be contained in a glovebag, adequately wet gasket, set up HEPA filtered local exhaust ventilation, and remove gasket and debris. Use nylon brushes and scraper to clean surfaces to which gasket was attached.
7. HEPA vacuum and/or wet wipe surfaces to which gasket was attached.
8. Install new gasket, reassemble equipment and perform maintenance work required and clean-up and tear-down steps on Level 3 checklist to complete work.

M31 . Summary

Emptying and changing filter in HEPA vacuum or changing filter in HEPA fan unit.

Summary This work practice covers the procedures for changing the bag, filter and/or cleaning a HEPA vacuum, or changing the filter in a HEPA filtered fan unit.

Examples

Level 2:
- A. Empty HEPA vacuum bag using localized engineering controls.
- B. Change filter in HEPA fan unit.
- C. Change filter or bag in HEPA vacuum using a glovebag.

Level 3:
- A. Empty bag, change filter and clean HEPA vacuum.
- B. Change filter in a HEPA fan unit in a mini-enclosure.

Related Work Practices

None

Worker Recommendations

One worker for Level 2. Two workers for Level 3. A person with air monitoring training might be required. This person can be the worker.

M31 . Level 2

Emptying and changing filter in HEPA vacuum or changing filter in HEPA fan unit.

Examples Level 2:

A. Empty HEPA vacuum bag using localized engineering controls.
B. Change filter in HEPA fan unit.
C. Change filter or bag in HEPA vacuum using a glovebag.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Manufacturer's instructions for unit having filter or bag replaced
   - Tools as needed to remove filter or bag
   - Replacement filters or bags
   - Glovebag and hand operated spray bottle
3. Prepare work area with drop cloth and HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth, including HEPA vacuum or fan unit with filter or bag to be changed. If available, include an operable HEPA vacuum for cleaning up any dust or debris from the filter change operation. If filter or bag will be changed using a glovebag, follow step 5A procedures. If a glovebag will not be used, follow step 5B procedures.
5. A. Insert new bag or filter, wet wiping cloths, and a hand-operated spray bottle into glovebag. Seal glovebag to unit to permit access to filter or bag inside glovebag. Open unit and adequately wet filter or bag. Remove filter or bag and place in corner of glovebag. Wet wipe inside of unit. Install new filter or bag. Close unit and wet wipe inside of glovebag. Put wet wipes in corner of glovebag. Twist, and tape glovebag to seal bag/filter/rags from spray bottle. Cut and remove glovebag from unit. Place glovebag into a disposal bag.
   B. Carefully disassemble unit as needed to access filter and/or bag. Adequately wet filter and/or bag, remove from unit and place into disposal bag. Using operable HEPA vacuum or wet wiping, clean area where filter or bag was installed.
6. Install new filter and/or bag in unit, reassemble unit and perform clean-up and tear-down steps on Level 2 checklist to complete work.

M31 . Level 3

Emptying and changing filter in HEPA vacuum or changing filter in HEPA fan unit.

Examples Level 3:

A. Empty bag, change filter and clean HEPA vacuum.
B. Change filter in HEPA fan unit in a mini-enclosure.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

This procedure may be performed in an existing mini-enclosure, if available.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Manufacturer's instructions for unit having filter or bag replaced
   - Tools as needed to remove filter or bag
   - Replacement filters or bags
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system or HEPA filtered local exhaust ventilation. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth, including HEPA vacuum or fan unit with filter or bag to be changed. If available, include an operable HEPA vacuum for cleaning up any dust or debris from the filter change operation.
5. Enter enclosure and carefully disassemble unit as needed to access filter or bag. Adequately wet filter and/or bag, remove from unit and place into disposal bag.
6. Adequately wet any remaining debris. Pick up debris or empty debris into a disposal bag.
7. Using operable HEPA vacuum or wet wiping, clean area where filter or bag was installed.
8. Install new filter and/or bag in unit, reassemble unit and perform clean-up and tear-down steps on Level 3 checklist to complete work.

M32 . Summary

Remove asbestos-wrapped wiring.

Summary This work practice covers the work required to remove small amounts of asbestos-wrapped electrical wiring for O&M work.

Examples

Level 1:
- A. Remove wiring in good condition on single stage spotlight.

Level 2:
- A. Remove wiring in good condition on several stage spotlights.
- B. Remove asbestos wrapped wiring located in underground electrical vaults where wrapping is in good condition. See APM8 regarding confined space precautions.

Level 3:
- A. Remove damaged wiring in poor condition.
- B. Remove asbestos wrapped wiring located in underground electrical vaults where wrapping is in poor condition. See APM8 regarding confined space precautions.

Related Work Practices

None

Worker Recommendations

One worker for Level 1 and Level 2. Two workers are recommended for Level 3 and/or if work occurs in a confined space. Workers should be trained electricians with asbestos training to perform this work. A person with air monitoring training might be required. This person can be the worker.

M32 . Level 1

Remove asbestos-wrapped wiring.

Example Level 1: A. Remove wiring in good condition on single stage spotlight.

Notes This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Verify that approval has been received from the EPA if wetting will not be used for removing asbestos-containing electrical wiring.
Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Electrician's insulated gloves
   - Screwdrivers
   - Wire cutters
   - Voltmeter
   - Soldering iron for soldered connections
3. Place tools, equipment and materials needed in work area. Verify that electrical power to wiring is shut off and locked out. Test circuits using voltmeter.
4. Put on insulated gloves and cut out exposed wiring to be removed. Roll up wiring and place into disposal bags.
5. Open any junction boxes or equipment as needed to remove wiring back to screw terminals or soldered connections.
6. Cut or disconnect wiring from terminals or connections. Place wiring into disposal bags. HEPA vacuum any surfaces that were in contact with wiring.
7. Perform maintenance work and clean-up and tear-down steps on Level 1 checklist to complete work.

M32 . Level 2

Remove asbestos-wrapped wiring.

Examples Level 2:

A. Remove wiring in good condition on several stage spotlights.

B. Remove asbestos wrapped wiring located in underground electrical vaults where wrapping is in good condition. See APM8 regarding confined space precautions.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Verify that approval has been received from the EPA if wetting will not be used for removing asbestos-containing electrical wiring.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Electricians insulated gloves
   - Screwdrivers
   - Wire cutters
   - Voltmeter
   - Soldering iron for soldered connections
3. Prepare work area with drop cloth. See General Procedure W9. Verify that electrical power to wiring is shut off and locked out. Test circuits using voltmeter.
4. Place tools, equipment and materials needed onto drop cloth.
5. Put on insulated gloves and cut out exposed wiring to be removed. Roll up wiring and place into disposal bags.
6. Open any junction boxes or equipment as needed to remove wiring back to screw terminals or soldered connections.
7. Disconnect remaining wiring from terminals or connections. Place wiring into disposal bags.
8. HEPA vacuum any surfaces that were in contact with wiring.
9. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M32 . Level 3

Remove asbestos-wrapped wiring.

Examples Level 3:

A. Remove damaged wiring in poor condition.

B. Remove asbestos wrapped wiring located in underground electrical vaults where wrapping is in poor condition. See APM8 regarding confined space precautions.

Notes

This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Verify that approval has been received from the EPA if wetting will not be used on electrical wiring to be removed.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Electricians insulated gloves
   - Screwdrivers
   - Wire cutters
   - Voltmeter
3. Prepare work area with drop cloth, erect mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation. See General Procedure W9. Verify that electrical power to wiring is shut off and locked out. Test circuits using voltmeter.
4. Place tools, equipment and materials needed into enclosure.
5. Enter enclosure, put on insulated gloves and cut out exposed wiring to be removed. Roll up wiring and place into disposal bags.
6. Open any junction boxes or equipment as needed to remove wiring back to screw terminals or soldered connections.
7. Cut or disconnect wiring from terminals or connections. Place wiring into disposal bags.
8. HEPA vacuum any surfaces that were in contact with wiring and any suspect visible debris.
9. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

M33 . Summary

Remove asbestos-containing caulking compound.

Summary This work practice describes the procedures for removing small amounts of asbestos-containing caulking compound as required for maintenance or repair work.

Examples

Level 1:	A.	Remove a small amount of pliable caulking compound. No sanding will be performed.
Level 2:	A.	Reglaze several small window panes. No sanding will be performed.
	B.	Remove small amount of dry caulking compound.
Level 3:	A.	Reglaze an entire window or several windows.

Related Work Practices

None

Worker Recommendations

One worker for Level 1 and Level 2. Two workers for Level 3. A person with air monitoring training might be required. This person can be the worker.

M33 . Level 1

Remove asbestos-containing caulking compound.

Example Level 1: A. Remove a small amount of pliable caulking compound. No sanding will be performed.

Notes This work practice must be used in conjunction with General Procedure **W1** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.
Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Scraper 2-3" (50-75 mm) wide stiff blade
3. Place tools, equipment and materials needed in work area.
4. Using utility knife or edge of scraper, cut away caulking and place into disposal bags.
5. Remove any residual caulking using scraper and knife and place caulking into disposal bags.
6. HEPA vacuum and/or wet wipe areas where caulking was removed.
7. Perform maintenance work and clean-up and tear-down steps on Level 1 checklist to complete work.

M33 . Level 2

Remove asbestos-containing caulking compound.

Examples Level 2:

A. Reglaze several small window panes. No sanding will be performed.

B. Remove small amount of dry caulking compound.

Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 2 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 2 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   - Scraper 2-3" (50-75 mm) wide stiff blade
   - Stiff nylon bristle brushes
3. Prepare work area with drop cloth. See General Procedure W9.
4. Place tools, equipment and materials needed onto drop cloth.
5. Enter work area and adequately wet caulking to be removed using garden sprayer with amended water.
6. Using utility knife or edge of scraper, cut away caulking and place into disposal bags.
7. Remove any residual caulking using scraper, knife and nylon brushes and place caulking into disposal bags.
8. HEPA vacuum and wet wipe areas where caulking was removed.
9. Perform maintenance work and clean-up and tear-down steps on Level 2 checklist to complete work.

M33 . Level 3

Remove asbestos-containing caulking compound.

Example Level 3: A. Reglaze an entire window or several windows

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Notes This work practice must be used in conjunction with General Procedures **W1, W9** and a **Level 3 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun.

Work Practice

1. Perform Pre-work activities on Level 3 checklist.
2. Additional tools, equipment and materials: (See General Procedure W1 for standard tools, equipment and materials list).
   - Scraper (2-3" wide stiff blade)
   - Stiff nylon bristle brushes
3. Prepare work area with drop cloth, mini-enclosure and set up negative pressure system and/or HEPA filtered local exhaust ventilation on side of window with exposed caulking compound. See General Procedure W9.
4. Place tools, equipment and materials needed into enclosure.
5. Enter enclosure and adequately wet caulking to be removed using garden sprayer with amended water.
6. Using utility knife or edge of scraper, cut away caulking and place into disposal bags.
7. Remove any residual caulking using scraper, knife and nylon brushes and place caulking into disposal bags.
8. HEPA vacuum and wet wipe areas where caulking was removed.
9. Perform maintenance work and clean-up and tear-down steps on Level 3 checklist to complete work.

M34 . Summary

Clean room that has asbestos-containing dust.

Summary This work practice should be used for routine or special cleaning in rooms where asbestos-containing dust is present, or is assumed to be present. The practices include the cleaning of furniture, fixtures, and other surfaces.

Examples

Level 1:

A. Clean an office area where asbestos-containing dust has settled on furniture due to air distribution from a supply air plenum with fireproofing ACM.

B. Clean a mechanical room where dust is assumed to contain ACM from thermal systems insulation present in room.

Related Work Practices

S9 - Clean room with exposed surfaces finished with ACM
M6 - Wet strip floor wax from resilient asbestos flooring
M7 - Dry or spray buffing resilient asbestos flooring
M8 - Cleaning resilient asbestos flooring
M29 - Clean up debris from minor release

Worker Recommendations

One worker trained in special cleaning procedures. A person with air monitoring training might be required. This person can be the worker.

M34 . Level 1

Clean room that has asbestos-containing dust.

Examples Level 1:

A. Clean an office area where asbestos-containing dust has settled on furniture due to air distribution from a supply air plenum with fireproofing ACM.

B. Clean a mechanical room where dust is assumed to contain ACM from thermal systems insulation present in room.

Notes This work practice must be used in conjunction with General Procedures **W1, W8** and a **Level 1 Worker Checklist**. The worker checklist includes tasks that must be performed before these work practices are begun. Use Work Practice M31 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.

Work Practice

1. Perform Pre-work activities on Level 1 checklist.
2. Additional tools, equipment and materials: (see General Procedure W1 for standard tools, equipment and materials list).
   Dusting materials (cloths, dusters, mops) that are damp or are treated with catatonic or anti-static dust attractant preparations.
   Furniture polish
3. Place Tools, equipment and materials needed in work area.
4. Using damp or treated dusting materials, clean surfaces beginning from the top of the room and working towards the floor. HEPA vacuum surfaces that are not easily cleaned with dusting materials. Surfaces that are not routinely cleaned (such as blinds) shall be wet wiped or washed with disposable cloths, folding the cloth inward until it is dirty on all surfaces and a new cloth is needed. Dispose of all dirty cloths and soiled dusting materials while still damp in ACM disposal bags.
5. Clean floor with HEPA vacuum. See General Procedure W8.
6. Apply new polish where needed using standard procedures.
7. Perform clean-up and tear-down steps on Level 1 checklist to complete work.

A

Appendix A

Job Request Form for Maintenance Work (from EPA Green Book)

Job Request Form for Maintenance Work

Name: _____ Date: _____

Telephone No. _____ Job Request No._____

Requested starting date:_____ Anticipated finish date:_____

Address, building, and room number(s) (or description of area) where work is to be performed: _____

_____

_____

_____

Description of work:

_____

_____

_____

_____

_____

Description of any asbestos-containing material that might be affected. if known (include location and type):

_____

_____

_____

_____

_____

_____

Name and telephone number of requestor:

_____

Name and telephone number of supervisor:

_____

Submit this application to:

_____

(The Asbestos Program Manager)

NOTE: An application must be submitted for all maintenance work whether or not asbestos-containing material might be affected. An authorization must then be received before any work can proceed.

_____ Granted (Job Request No. _____)

_____ With conditions*

_____ Denied

*Conditions: _____

B

Appendix B

Maintenance Work Authorization Form (from EPA Green Book)

Maintenance Work Authorization Form No. _____

AUTHORIZATION

Authorization is given to proceed with the following maintenance work:

_____
_____
_____
_____
_____
_____
_____

PRESENCE OF ASBESTOS-CONTAINING MATERIALS

_____ Asbestos-containing materials are not present in the vicinity of the maintenance work.

_____ ACM is present. but its disturbance is not anticipated: however, if conditions change, the Asbestos Program Manager will re-evaluate the work request prior to proceeding.

_____ ACM is present. and may be disturbed.

Work Practice if Asbestos-Containing Materials Are Present

The following work practices shall be employed to avoid or minimize disturbing asbestos:

_____
_____
_____
_____
_____
_____
_____

Personal Protection if Asbestos-Containing Materials Are Present

The following equipment/clothes shall be used/worn during the work to protect workers:

_____
_____
_____
_____
_____
_____

(manuals on personal protection can be referenced)

Special Practices and/or Equipment Required:

_____
_____
_____
_____
_____

Signed: _____ Date: _____

(Asbestos Program Manager)

C

Appendix C

Evaluation of Work Affecting Asbestos-Containing Materials (from EPA Green Book)

This evaluation covers the following maintenance work:
Location of work (address, building, room number(s), or general description):

_____
_____
_____
_____

Date(s) of work: _____

Description of work: _____

Work approval form number: _____

Evaluation of work practices employed to minimize disturbance of asbestos:

_____
_____
_____
_____
_____

Evaluation of work practices employed to contain released fibers and to clean up the work area:

_____
_____
_____
_____
_____

Evaluation of equipment and procedures used to protect workers:

_____
_____
_____
_____
_____

Personal air monitoring results: (in-house worker or contract?)
Worker name _____ Results: _____
Worker name _____ Results: _____

Handling or storage of ACM waste: _____

Signed: _____ Date: _____
(Asbestos Program Manager)

D

Appendix D

Waste Tracking Form

Waste Tracking Form

Part 1 - To be completed by workers:

Maintenance World Authorization No. _____

Work Location: Building: _____

Room # or Area: _____

Type of ACM Removed: _____

Quantity of Waste generated: _____ Bags

Other containers: _____

_____

Waste transported to: _____

Transported by: _____

Tracking Form given to: _____

Part 2 - To be completed by Asbestos Program Manager

Waste Properly Packaged & Labeled: Yes _____ No _____

EXCEPTIONS: _____

_____

Waste Storage Location: _____

Waste Disposal Location: _____

Waste Shipment Records Received: _____

Date: _____

SIGNED: _____

ASBESTOS PROGRAM MANAGER

DATE: _____

E

Appendix E

Glossary

Acoustical Plaster Sound absorbing finishing material mill-formulated for application in areas where a reduction in sound reverberation or noise intensity is desired. These materials usually are applied in a minimum thickness of 1/2" (13 mm). The finish material is applied over gypsum plaster, plaster brown coat or other base plaster. The surface material is usually friable and has a rough surface appearance.

Acoustic Tile Tile-shaped blocks of sound absorbent material used for ceilings or as wall facing. May be glued to substrate or laid in a rigid grid work.
ACM (ACBM) Asbestos-Containing Material (Asbestos-containing Building Material). Any material containing more than one percent asbestos.

Adequately Wet Adequately Wet means sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet.

Air Monitoring The process of measuring the fiber content of a specific volume of air.

Amended Water Water to which a surfactant has been added for use in wetting ACM to control asbestos fibers.

Asbestos Chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos and any of these minerals that has been chemically treated and/or altered.

ACM Asbestos-Containing Materials. Any material containing more than one percent asbestos.

ACBM Asbestos-Containing Building Materials. Surfacing materials, thermal system insulation materials or miscellaneous materials that are found in or on interior structural members of other parts of a building.

Asbestos-Containing Waste Material Mill tailings or any waste that contains commercial asbestos and is generated by a source regulated under NESHAP. This term includes filters from control devices, friable asbestos waste material, and bags or other similar packaging contaminated with commercial asbestos. As applied to demolition and renovation operations, this term also includes regulated asbestos-containing waste and materials contaminated with asbestos including disposable equipment and clothing.

Asbestos debris Pieces of ACBM that can be identified by color, texture, or composition, or means dust, if the dust is determined by an accredited inspector to be ACM.

Asbestos Hazard Emergency Response Act (AHERA) An EPA regulation published in the October 30, 1987 Federal Register covering asbestos-containing materials in schools. AHERA requires local education agencies to identify ACM in their school buildings, develop an asbestos management plan and implement this plan. An O&M program is one permitted response action, where appropriate.

Asbestos O&M Work Cleaning, maintenance, repair or renovation work involving asbestos containing materials where the intent of the activity is not to remove asbestos. NESHAP requires that the owner or operator of a demolition or renovation activity conduct a thorough inspection of the affected facility or part of the facility where demolition or renovation will occur.

Asbestos Program Manager (APM) A building owner or designated representative who supervises all aspects of the facility asbestos management and control program.

Breathing Zone A hemisphere forward of the shoulders with a radius of approximately 6" to 9" (150-230 mm).

Bridging encapsulant An encapsulant that forms a discrete layer on the surface of an in situ asbestos matrix.

Concealed Suspension or Concealed Spline Ceiling System Presents a monolithic ceiling surface, unobstructed by the cross-hatching of exposed grid members. Tiles are typically 12" x 12" (305 x 305 mm) or 12" x 24" (305 x 610 mm) with slots or kerfs cut into the edges of tiles for the purposes of accepting flat or "T" splines to support the tiles.

Confined Space A space that has limited openings for entry and exit, unfavorable natural ventilation and/or a space not designed for continuous worker occupancy. Examples include boilers, furnaces, pits, septic tanks, manholes, silas and utility vaults.

Critical Barrier One or more layers of polyethylene taped in place over openings into a work area. Openings to be covered include doors, windows, diffusers, and any other opening that could allow outside air into a work area.

Decorative Acoustic Finish: Finishing material mill-formulated and spray applied up to about 3/8" (10 mm) thick over gypsum wallboard. Material has a rough surface and is similar in appearance to acoustic plaster but is not designed for sound absorption.

Delamination Separation of one layer from another.

Disposal Bag Properly labeled 6 mil (0.15 mm) thick (or thicker) leak-tight plastic bags used for transporting asbestos waste from work and to disposal site.

Drop Cloth A layer of polyethylene on the floor of a work area to protect the floor below from contamination and to facilitate the clean-up of dust or debris generated during the work.

Encapsulant A material that surrounds or embeds asbestos fibers in an adhesive matrix, to prevent release of fibers.

Enclosure The construction of an air-tight, impermeable, permanent barrier around asbestos-containing material to control the release of asbestos fibers into the air.

EPA U.S. Environmental Protection Agency

Excursion Limit (EL) The OSHA term used to define a maximum airborne concentration of asbestos in fibers per cubic centimeter as averaged over a sampling period of thirty minutes.

Fiber Release Any uncontrolled or unintentional disturbance of ACBM resulting in visible emission.

Fireproofing Material applied to structural elements or systems which provides increased fire resistance, usually serving no structural function. This material is typically applied using spray equipment.

Friable Asbestos (See "Regulated ACM")

Glovebag A polyethylene or polyvinyl chloride bag-like enclosure affixed around an asbestos-containing source (most often, TSI) so that the material may be removed while minimizing release of airborne fibers to the surrounding atmosphere.

HEPA Filter High-Efficiency Particulate Air Filter. Such filters are rated to trap at least 99.97% of all particles 0.3 microns (0.3 μm) in diameter or larger.

Medical Surveillance A periodic comprehensive review of a worker's health status. The required elements of an acceptable medical surveillance program are listed in the Occupational Safety and Health Administration standards for asbestos.

Mini-Enclosure An enclosure constructed of polyethylene sheeting used for small scale, short duration asbestos maintenance or renovation work. Mini-enclosures can be small enough to restrict entry to the asbestos work area to one worker. Appendix G to OSHA regulation 29 CFR 1926.58 discusses mini-enclosures and recommends that a change room be constructed contiguous to the mini-enclosure.

Miscellaneous ACM Interior asbestos-containing building material on structural components, structural members or fixtures,such as floor and ceiling tiles; does not include surfacing material or thermal system insulation.

Negative Pressure System A local exhaust system intended to prevent the escape of contaminated air to the surrounding environment. It utilizes HEPA filtration capable of maintaining a pressure differential with a lower pressure inside the Work Area than in any adjacent area. This system recirculates clean air and/or generates a constant flow of air from adjacent areas into the work area.

Negative Pressure Respirator A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.

NESHAP National Emission Standard for Hazardous Air Pollutants - EPA Rules under the Clean Air Act.

NIOSH The National Institute for Occupational Safety and Health, which was established by the Occupational Safety and Health Act of 1970. Primary functions of NIOSH are to conduct research, issue technical information, and certify respirators.

Operations & Maintenance (O&M) Program A program of work practices to maintain ACM in good condition, ensure clean up of asbestos fibers previously released, and prevent further release by minimizing and controlling ACM disturbance or damage.

Occupied Area An area where personnel are present and are performing their normal activities intended for the area (such as in a typical office area from 8:00 to 5:00 p.m., Monday through Friday).

OSHA Occupational Health & Safety Administration

Penetrating Encapsulant An encapsulant that is absorbed by the in situ asbestos matrix without leaving a discrete surface layer.

Personal Air Samples An air sample taken with a sampling pump directly attached to the worker with the collecting filter and cassette placed in the worker's breathing zone. These samples are required by the OSHA asbestos standards and the EPA Worker Protection Rule.

Phase Contrast Microscopy (PCM) A method of analysis using a light microscope, used to find the concentration of airborne fibers. Does not distinguish among asbestos and other fibers. Used by OSHA to find personal exposures, and by EPA to find area levels for AHERA project clearance.

Plenum Any space to convey air in a building or structure. The space above a suspended ceiling is often used as an air plenum. This term is also used in the work practices to refer to spaces above a ceiling not used to convey air.

Polarized Light Microscopy (PLM) A method of analysis using a light microscope to find the chemical or mineral types of samples, including the concentration of asbestos in bulk materials. Used by EPA for AHERA and NESHAP, and by OSHA to see if asbestos is involved in a project.

Protection Factor The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

Regulated ACM (RACM) As defined by NESHAP in the November 20, 1990 Federal Register, regulated asbestos-containing material (RACM) means (a) Friable asbestos material (b) Category I nonfriable ACM that has become friable. (c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by this subpart.

(**Note:** Regulated ACM is an EPA NESHAP concept. OSHA makes no distinction between friable and non-friable asbestos).

"Cutting" means to penetrate with a sharp-edged instrument and includes sawing, but does not include shearing, slicing or punching.

"Grinding" means to reduce powder or small fragments and includes mechanical clipping or drilling.

> **Friable asbestos material** means any material containing more than 1 percent asbestos as determined using the method specified under AHERA (40 CFR Part 763, Sub-part F, Appendix A , section 1, Polarized Light Microscopy) that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent as determined by a method other than point counting by polarized light microscopy (PLM), verify the asbestos content by point counting using PLM.
>
> **Category I nonfriable asbestos-containing material (ACM)** means asbestos-containing packings, gaskets, resilient floor covering and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified under AHERA.
> **Category II nonfriable ACM** means any material, excluding Category I nonfriable ACM. containing more than 1 percent asbestos as determined using the methods specified under AHERA, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Remove For Operations and Maintenance work on ACM, "remove" refers to the removal of ACM as needed to perform a maintenance or repair O & M activity.

Removal Encapsulant A penetrating encapsulant specifically designed to minimize fiber release during removal of asbestos-containing materials rather than for in situ encapsulation.

Repair Returning damaged ACBM to an undamaged condition or to an intact state so as to prevent fiber release.

Respirator A device designed to protect the wearer from the inhalation of harmful particulates.

Small-scale, Short-duration (See Appendix H)

Surfacing ACM Asbestos-containing material that is sprayed-on, troweled-on or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural member, or other materials on surfaces for acoustical, fireproofing, or other purposes.

Suspended "T" Bar Ceiling System A false or dropped ceiling composed of acoustic tiles laid into an inverted metal "T" bar grid frame suspended by wires from building framing members.

Surfactant A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.

Temporary Barriers One or more layers of 6 mil polyethylene installed to isolate a work area from other portions of a facility.

Thermal System Insulation (TSI) Thermal system insulation - asbestos-containing material applied to pipes, fittings, boilers, breeching, tanks, ducts or other interior structural components to prevent heat loss or gain or water condensation.

Time Weighted Average (TWA) In air sampling, this refers to the average air concentration of contaminants during a particular time period.

Transmission Electron Microscopy (TEM) A method of analysis using an electron microscope, used to find and analyze the concentration of airborne or bulk asbestos fibers and structures. Distinguishes among asbestos and other materials; can detect smaller asbestos fibers than does PCM. Used by EPA to find area concentrations for large AHERA project clearance.

Work Area The area where asbestos-related work or removal operations are performed which is defined and/or isolated to prevent the spread of asbestos dust, fibers or debris, and entry by unauthorized personnel.

Work Practices Procedures designed to be followed to avoid or minimize fiber release during activities affecting ACM.

F

Appendix F

References

EPA Regulations

United States Environmental Protection Agency, Asbestos Abatement Projects; Worker Protection; Final Rule ("Worker Protection Rule") 40 CFR 763.120-126 , Washington D.C., 1987.

United States Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR 61.140-157, Washington D.C., 1984, revised 1990.

United States Environmental Protection Agency, Asbestos-Containing Materials in Schools; Final Rule and Notice (Asbestos Hazard Emergency Response Act - AHERA) 40 CFR 763.80-99, Washington D.C., 1987.

EPA Guidance Documents

(Order by Calling TSCA Assistance Hotline in Washington, DC at: (202) 554-1404).

United States Environmental Protection Agency, Managing Asbestos in Place ("Green Book") EPA Publication #20T-2003, Washington D.C., 1990.

United States Environmental Protection Agency, Guidance for Controlling Asbestos-Containing Materials in Buildings ("Purple Book") EPA publication #560/5-85-024, Washington D.C., 1985.

United States Environmental Protection Agency, A Guide to Respiratory Protection for the Asbestos Abatement Industry ("White Book) EPA publication #560-OPTS-86-001, Washington D.C., 1986.

United States Environmental Protection Agency, Simplified Sampling scheme for Surfacing Materials (Pink Book") EPA publication #560/5-85-030a, Washington D.C., 1985.

United States Environmental Protection Agency, EPA Guidance for Service and Maintenance Personnel, EPA publication #560/5-85-018, Washington D.C., 1985.

United States Environmental Protection Agency, Model training course materials for accrediting Asbestos Building Inspectors and Management Planners in accordance with AHERA, Washington D.C., 1987.

United States Environmental Protection Agency, Abatement of Asbestos-Containing Pipe Insulation, Asbestos-in-Buildings Technical Bulletin 1986-2, Washington D.C., 1986.

OSHA Regulations

Occupational Safety and Health Administration, Asbestos Regulations for the Construction Industry 29 CFR 1926.58, Washington D.C., 1986.

Occupational Safety and Health Administration, Respiratory Protection 29 CFR 1910.134, Washington, D.C., 1978.

Occupational Safety and Health Administration, Hazard Communication Standard for the Construction Industry 29 CFR 1926.59, Washington D.C., 1987.

U.S. General Services Administration (PMSE)	Documentation Package for Asbestos Operations & Maintenance Programs, Washington D.C., 1990.
Asbestos Information Center	(Air monitoring guidance, etc.)
Miscellaneous References	Institute for Environmental Assessment, 433 Jackson Street, Anoka, MN 55303: 1. Suggested Operations and Maintenance Procedures 2. Guide to Asbestos Personal Monitoring 3. Recognition of Damage, Deterioration and Delamination 4. Aerodynamic Characteristics of Asbestos Keyes, Dale L. and Chesson, Jean. Guide to Monitoring Airborne Asbestos in Buildings, Tucson, AZ, 1989. Health Effects Institute - Asbestos Research, Asbestos in Public and Commercial Buildings A Literature Review and Synthesis of Current Knowledge, Cambridge, MA, 1991.

O&M Program Elements References

Element	Regulations & Guidance Document	Green Book Guidance
APM Appointment & Training	Purple Book, AHERA, White Book	Pgs. 7 & 23 - 25
Worker Training	Purple Book, AHERA, White Book	Pgs. 23 - 25
Building Inspection & Assessment	Purple Book, AHERA, Pink Book	Pg. 7
Occupant Notification & Communication	AHERA	Pgs. 12 - 13, 28 - 29
Hazard Communication Program	OSHA 29 CFR 1910.1200 & OSHA 29 CFR 1926.59.	Pg. 22
Worker Protection Program	OSHA 29 CFR 1926.58	Pgs. 17 - 18, 38
Respiratory Protection Program	White Book, OSHA 29 CFR 1910.134, 1926.58	Pgs. 17 - 18
Medical Surveillance	OSHA 29 CFR 1926.58	Pg. 27
Work Permit System	----------	Pg. 15
Waste Disposal	EPA NESHAP 40 CFR 61.145,150 OSHA 29 CFR 1910.1200, DOT 49 CFR Parts 171 & 180	Pg. 28
Recordkeeping	AHERA	Pg. 22
Fiber Releases	Purple Book, AHERA	Pgs. 20 - 21
Periodic Surveillance & Reinspection	Purple Book, AHERA	Pg. 14
Air Monitoring	Purple Book, AHERA OSHA 29 CFR 1926.58	Pgs. 10, 14 - 15
Confined Spaces	Federal Register June 5, 1989 OSHA Proposed Rules	----------
General Safety Hazards	White Book Appendix D OSHA 29 CFR Part 1926	----------

ADDITIONAL ASSISTANCE AND TRAINING

EPA REGIONAL CONTACTS

Additional assistance can be obtained from your U.S. EPA Regional Asbestos Coordinators, NESHAP Regional Coordinators, and OSHA Regional Offices. Their telephone numbers are listed below:

EPA REGION I: (CT,ME,MA,NH,RI,VT)
Asbestos Coordinator (617) 565-3835
NESHAP Coordinator (617) 565-3265

EPA REGION II: (NJ,NY,PR,VI)
Asbestos Coordinator (201) 321-6671
NESHAP Coordinator (212) 264-6770

EPA REGION III: (DE,DC,MD,PA,VA,WV)
Asbestos Coordinator (215) 597-3160
NESHAP Coordinator (215) 597-6550

EPA REGION IV: (AL,FL,GA,KY,MS,NC,SC,TN)
Asbestos Coordinator (404) 347-5014
NESHAP Coordinator (404) 347-2904

EPA REGION V: (IL,IN,MI,MN,OH,WI)
Asbestos Coordinator (312) 886-6003
NESHAP Coordinator (312) 353-2088

EPA REGION VI: (AR,LA,NM,OK,TX)

Asbestos Coordinator (214) 655-7244
NESHAP Coordinator (214) 655-7229

EPA REGION VII: (IA,KS,MO,NE)
Asbestos Coordinator (913) 551-7020
NESHAP Coordinator (913) 551-7020

EPA REGION VIII: (CO,MT,ND,SD,UT,WY)
Asbestos Coordinator (303) 293-1442
NESHAP Coordinator (303) 294-7685

EPA REGION IX: (AZ,CA,HI,NV,AS,GU)
Asbestos Coordinator (415) 556-5406
NESHAP Coordinator (415) 556-5526

EPA REGION X: (AK,ID,OR,WA)
Asbestos Coordinator (404) 442-4762
NESHAP Coordinator (206) 442-1757

G

Appendix G

General Safety Considerations
(This section is reprinted from Appendix D of the EPA's White Book for use by personnel performing O & M activities.)

General Safety Considerations

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This guide was primarily developed to provide recommendations concerning worker respiratory protection within the asbestos abatement industry. However, employers must not lose sight of the safety hazards their employees are exposed to in performance of their work. Asbestos abatement operations can take place in a variety of industrial, commercial and public settings. Each has unique potential safety hazards that the employer must control. However, nearly all abatement operations have some common safety hazards. With proper job planning and supervision. the employer can control both the health hazards and the safety hazards faced by their workers. The more common safety hazards associated with abatement operations and general recommendations to control them are discussed below. Sources for more specific safety information are listed to supplement and support the applicable OSHA regulatory standards.

1. Elevated Work Surfaces

The nature of asbestos abatement tasks usually requires workers to work from ladders. scaffolds, manlifts, or other elevated surfaces, which creates the potential for fall injuries. Slips and falls from ladders, scaffolds, and other elevated surfaces result in a major portion of the construction industry injuries. Many of these can be prevented by implementing a few control measures:

A. General

(1) Avoid use of makeshift work platforms by providing portable ladders and scaffolds.

(2) Ensure that job-built elevated work surfaces are inspected by a competent person <u>other</u> than the individual who erects it.

(3) Avoid working from elevated surfaces where possible. Consider use of wands for spraying amended water or scrapers with extended handles.

B. Ladders

Eighty percent of ladder-related accidents result from improper use or application.

(1) Workers should face the ladder when climbing up, down, or working from it.

(2) Workers should not carry objects in their hands while ascending or descending ladders. While working from a ladder they should hold on with at least one hand.

(3) Ladders should not be used as a substitute for planks, runways, or walkboards.

(4) Ladders should be maintained in good condition. Defective ladders should be destroyed so that no one uses them by mistake.

(5) Ladders should have safety feet in good condition to keep the ladder from slipping and cutting through polyethylene floor covers.

(6) Ladder rungs/steps should be kept free of contaminates such as amended water and buildup of asbestos waste.

(7) Employees should work no higher than the fourth step/rung from the top of the ladder.

(8) Employees should not attempt to "reach" distant objects from a ladder; other platforms should be used.

(9) Wood or fiberglass ladders should be provided to help control exposure to electrical hazards.

(10) Employees Should not straddle the space between a ladder and another object.

(11) Employees should make a visual inspection of ladders before each shift.

Additional information sources:

"Ladders" -- publication no. ISBN 0-919465-05-6

Construction Safety Association of Ontario
74 Victoria Street
Toronto. Ontario Canada M5C 2A5

"Safety Requirements for Portable Wood Ladders" -- ANSI A14.1 - 1982

"Safety Requirements for Job-Made Ladders" -- ANSI A14.4 - 1979

"Safety Requirements for Portable Reinforced Plastic Ladders" -- ANSI A14.5 - 1982

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

"Portable Ladders" -- Industrial Safety Data Sheet #665

National Safety Council
444 North Michigan Avenue
Chicago Illinois 60611

Environmental Health and Safety Division
Georgia Tech Research Institute
Georgia Institute of Technology
Atlanta, Georgia 30332

C. Scaffolds

Falls from scaffolds result in about 2,000 injuries per month in the United States. These can be reduced by

(1) providing guardrails around the perimeter of the work surface regardless of scaffold height

(2) securing scaffold decks against slippage

(3) keeping scaffold uprights vertical and pinned together when stacked

(4) ensuring vertical members are braced to keep the scaffold plumb and level

(5) decking the entire top portion of the work surface in lieu of using minimum planking dimensions

(6) extending planks at least 6" (150 mm) over their support and clearing or restraining them from movement

(7) ensuring that manufacturer built-in ladders are in good condition

(8) maintaining mobile scaffold casters in good condition with position locking devices secured when employees are working from the scaffold

(9) keeping mobile scaffolding height less than four times the minimum base dimension and with adequate cross-bracing

(10) never interchanging scaffolding pans from different units

(11) never using defective scaffolding

(12) designating only "Competent" persons to perform scaffolding repairs.

Additional information sources:

"Manually Propelled Mobile Ladder Stands and Scaffolds" - ANSI A92.1 - 1977

"Manually Propelled Elevating Work Platforms" -- ANSI A92.3 - 1980

"Self-Propelled Elevating Work Platforms" -- ANSI A92.6

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

II. Electrical Hazards

Asbestos abatement is often related to renovation or remodeling activities. Normally the equipment, machinery, overhead lighting fixtures. and auxiliary furnishings are removed to facilitate the abatement work. However, it is becoming more common that industrial and commercial buildings remain partially occupied while abatement operations are performed. In either situation. the abatement operator must take positive actions to protect employees from accidently coming into contact with energized electrical circuits.

A. General

(1) Perform a pre-work walk-through of the abatement area to look for pre-existing electrical hazards involved with the work.

(2) De-energize as many circuits as possible.

(3) Verify that the circuits have been de-energized with a "Field Current Sensing Device" circuit tester. Either lock out/tag out all de-energized circuits to prevent them from accidentally being energized.

(4) Use non-conductive tools such as scrapers and vacuum attachments made of wood, plastic, or rubber.

(5) Provide workers with non-conductive rubber boots and/or gloves when work must be done around energized wiring or equipment.

(6) Prohibit accumulation of puddles of water on the floor. Workers should be trained in the intelligent use of amended water. No water should be used around energized circuits.

B. Permanent Building Circuitry

(1) Ensure that all permanent circuits are provided with a grounding system. This can be determined with a portable ground tester.

(2) Ensure that electrical outlets are tightly sealed and taped to avoid water spray.

(3) Determine what equipment must remain energized during the abatement process.

(4) Insulate or guard energized equipment and Wiring from employee contact and other conductive objects.

(5) Avoid damaging permanent building wiring during the work.

(6) Consider dry removal methods in the vicinity of electrical equipment which must remain energized.

C. Temporary Power

(I) All temporary circuits provided by the abatement operator must be provided with a grounding system and protected by ground fault circuit interrupters.

(2) Avoid stringing temporary wiring across floors

(3) Elevated wiring should not be fastened with staples. nails, or wire.

(4) Use care not to damage the wiring insulation during Installation or abatement work.

D. Electrical Cords and Tools

(1) Provide extension cords which have a ground conductor.

(2) Ensure that cords are not damaged, contain no splices. and that the ground lug on the male plug is intact.

(3) Position extension cords to eliminate stumbling/tripping hazards and to protect them from damage by moving scaffolds.

(4) Provide electrical tools which are either grounded or of the double-insulated type

(5) Use shatterproof, guarded bulbs and heavy duty wiring for temporary lighting.

(6) Where plugs enter receptacles, ensure that the connection is protected by use of duct tape or by other means.

Additional information sources:

"National Electrical Safety Code" -- ANSI C2-1984

"National Electrical Code" -- ANSI/NFPA 70-1984

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

"Temporary Electric Wiring for Construction Sites" -- Industrial Safety Data Sheet #515

National Safety Council
444 North Michigan Avenue
Chicago, Illinois 60611

III. Housekeeping

Asbestos abatement operations present continuous housekeeping problems. The accumulation of asbestos and other debris on polyethylene-covered floors create employee slipping and tripping hazards. It is essential that accumulation of such debris be bagged and removed from the floor as soon as possible. Even though this activity may initially require more effort. it will make final cleanup easier and the work area safer.

Additional information source:

"Supervisors Safety Manual"
National Safety Council
444 North Michigan Avenue
Chicago, Illinois 60611

IV. Emergency Planning

The abatement operator should develop emergency procedures for fires or severely injured employees. Since abatement work areas must be sealed off. thereby blocking normal exits. the operator must familiarize the workers with procedures for safe exit in case of fire. Furthermore, the operator should develop plans for obtaining emergency aid in case of severe employee injury. The plans should be compatible with decontamination procedures yet provide for quick medical aid.

Additional information source:

Environmental Health and Safety Division
Georgia Tech Research Institute
Georgia Institute of Technology
Atlanta, Georgia 30332

H

Appendix H

Definitions of Small-Scale, Short-Duration Operations

This section sets forth the EPA and OSHA definitions of small-scale, short-duration operations -- the scope of work intended under this manual. All references are to the Code of Federal Regulations (CFR), the Federal Register (Fed. Reg.), or the OSHA Compliance Manual (OSHA INSTR.)

This manual is intended for use only with operations qualifying as "small-scale, short-duration" projects under OSHA and EPA regulations and regulatory guidelines. A summary of these regulations and guidelines are set forth below. The complete regulations should be consulted for full information related to these definitions. The reader should review this Appendix in its entirety for a complete understanding of the current regulatory picture, and of the proposed changes to those regulations. The reader should also consult the regulations at the time of use to ensure that these definitions are still in place. Local and state guidelines and regulations should also be consulted.

1. OSHA DEFINITIONS

A. Current Definition The definition contained in Appendix G of the construction asbestos standard (29 C.F.R. 1926.58) is as follows:

For the purposes of this appendix, small-scale, short-duration renovation and maintenance activities are tasks such as, but not limited to:

- Removal of asbestos-containing insulation on pipes:
- Removal of small quantities of asbestos-containing insulation on beams or above ceilings;
- Replacement of an asbestos-containing gasket or valve;
- Installation or removal of a small section of drywall;
- Installation of electrical conduits through or proximate to asbestos-containing materials.

29 C.F.R. § 1926.58, App. G.

B. **Problems With the Current OSHA Definition** OSHA has been under court order since February, 1988 to amend its definition of its exemption from the negative pressure enclosure requirement for small-scale, short-duration operations, because, as the court found, "the exception as now worded seems to erase the rule." See Building and Construction Trades Department, AFL-CIO v. Brock, 838

F.2d 1258, 1279 (D.C. Cir. 1988). OSHA is currently revising its definition as part of a rulemaking procedure begun in 1990 and is expected to promulgate a new regulation in 1992. OSHA's proposal is set forth below at 1.D.

C. **Clarifications Contained in OSHA INSTRUCTION CPL 2-2.40** OSHA has issued only one compliance directive on the asbestos standard; the directive further defines small-scale operations as follows:

29 C.F.R. 1926.58(e)(6)(iv)grants exceptions from the requirements of establishing negative-pressure enclosures and designating a competent person, if the operation is small-scale, short-duration. For the purposes of this standard a "small-scale, short-duration" operation is defined as:

(1) Maintenance or renovation tasks, where the removal of asbestos-containing materials is not the primary goal of the job (e.g., repairing a valve which entails the removal of asbestos, installing electrical conduit which must be fastened to asbestos cement siding, etc.)

(2) Activities where the employees' exposures to asbestos can be kept below the action level via worker isolation techniques, such as glove bags or other methods described in Appendix G.

(3) An operation which has been included in the employer's asbestos maintenance program (as required in Appendix G) of all employers who are claiming an exemption from the requirements of 29 C.R.R. 1926.58(e)(6).

(4) Nonrepetitive operations (viz.: not a series of small-scale jobs, which if performed at one time would have resulted in a large-scale removal).

OSHA Instruction CPL 2-2.40 (September 1, 1987).

D. **OSHA's Proposed Revisions to the Current Definition**

NOTE: This sections describes <u>proposed rules</u> that are not legally binding as of September 1992. OSHA may change this definition in the final rules.

(1) Regulated Areas OSHA has proposed to require regulated area protections for all maintenance work covered under the construction asbestos standard, including small-scale, short-duration operations, regardless of measured exposure levels. (55 Fed. Reg. 23,752 (1990).

(2) Proposed Definition of Small-Scale, Short-Duration

Operations OSHA's proposed definition first sets forth general criteria, then lists specific operations that fall within those criteria. (55 Fed. Reg. 29,717.) The general criteria are that the operations are:

- non-repetitive;
- affect small surfaces or volumes of material containing asbestos, tremolite, anthophyllite, or actinolite; and
- will be completed within one work day; and
- are not expected to expose bystanders to significant amounts of asbestos." (Id.)

The proposal includes the following as illustrations of small-scale, short-duration operations:

- repair or removal of asbestos on pipes that is less than 21 linear feet (6.4 m);
- repair or removal of asbestos panel that is less than 9 square feet (0.8 m^2);
- pipe valve repair or replacement of pipe valves containing asbestos gaskets or electrical work that disturbs asbestos that is completed by one worker in less than four hours;
- removal of drywall which is completed for the facility within an eight-hour workday;
- renovation projects involving endcapping of pipes and tile removal that is completed in less than four hours; and
- installation of conduits that is completed within an eight-hour work shift.

55 Fed. Reg. 29,751 (1990).

2. EPA Definitions

A. AHERA The EPA definition under AHERA (40 CFR 763 - Appendix B to Subpart E) repeats the basic OSHA definition (contained in 1.A., above), but adds the following clarifications:

Small-scale, short-duration maintenance activities can be further defined, for the purposes of this subpart, by the following considerations:

(1) Removal of small quantities of asbestos-containing materials (ACM) only if required in the performance of another maintenance activity not intended as asbestos abatement.

(2) Removal of asbestos-containing thermal insulation not to exceed amounts greater than those which can be contained in a single glove bag.

(3) Minor repairs to damaged thermal system insulation which do not require removal.

(4) Repairs to a piece of asbestos-containing wallboard.

(5) Repairs, involving encapsulation, enclosure or removal, to small amounts of friable asbestos-containing material only if required in the performance of emergency or routine maintenance activity and not intended solely as asbestos abatement. Such work may not exceed amounts greater than those which can be contained in a single prefabricated minienclosure. Such an enclosure shall conform spatially and geometrically to the localized work area, in order to perform its intended containment function.

40 C.F.R. 763, App. B to Subpart E (emphasis added).

B. Worker Protection Rule The EPA Worker Protection Rule (40 C.F.R. 763.121-126) regulates worker protection for those public employees not covered under the OSHA regulation or under state plan programs, on abatement jobs other than in schools. The rule covers only abatement jobs and does not apply to small-scale, short-duration operations.

The implicit cut-off point is in the reporting requirement to EPA: the rule requires pre-job reporting of abatement projects, except ones that involve "less than either three linear (1 m) or three square feet (0.3 m^2) of friable asbestos" or an emergency project. 40 C.F.R. § 763.124.

C. Major/Minor Fiber Release Categories Under AHERA EPA also utilizes the 3 square or 3 linear feet cut-off in its regulations covering operations and maintenance in schools (40 C.F.R. 763.91). Paragraph (f), which regulate "fiber release episodes," defines a "major fiber release episode" requiring a trained abatement worker, as "the falling or dislodging of more than 3 square (0.8 m^2) or 3 linear feet (1 m) of friable ACM." (40 C.F.R. 763.91(f)(2).).

D. NESHAP EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 61, applies to demolition or renovation activities, and "individual nonscheduled operations" (such as O&M or emergency renovation operations work). NESHAP applies if the renovation or demolition involves more than the following amounts of regulated asbestos-containing material (RACM) on a single project, or if the combined additive amount of RACM to be removed or stripped during a calendar year of January 1 through December 31 exceeded:

(1) At least 80 linear meters (260 linear feet) on pipes or at least 15 square meters (160 square feet) on other facility components, or

(2) At least 1 cubic meter (35 cubic (feet) off facility components where the length or area could not be measured previously.

NESHAP also requires:

(1) A thorough inspection of the affected facility, or part of the facility where the demolition or renovation operation will occur, for the presence of asbestos, including Category I and Category II non-friable ACM. (See Appendix E for definitions).

(2) Written notification to the EPA prior to the start of operations regulated under NESHAP (40 CFR 61.145 (b)).

(3) Wetting RACM when it is stripped from a facility component while it remains in place in the facility during the stripping operation.

In renovation operations, wetting is not required if:

a. Prior written approval is obtained from the EPA if wetting would unavoidably damage equipment or present a safety hazard.

b. A local exhaust ventilation system designed and operated to capture the particulate asbestos material produced by the stripping and removal of the asbestos materials.

c. A glovebag system is used.

d. Leak-tight wrapping is used to contain all RACM prior to dismantlement.

See 40 CFR 61.145 (c) (3) for specific details on these options.

(4) A person trained in the NESHAP provisions on-site during stripping, removal, or other handling or disturbance of ACM in a NESHAP regulated facility.

(5) RACM handling, waste packaging and waste tracking requirements.

(6) If the asbestos content of a material is determined by Polarized Light Microscopy (using 40 CFR Part 763, Section 1, Appendix A, subpart F method) to be less than 10 percent, verify the asbestos content by

point counting using Polarized Light Microscopy. Alternatively, the material may be assumed to be, and treated as, ACM.

I

Appendix I

Regulations

Note: This information is reproduced from chapter 6 of the Green Book.

Building owners are governed by a variety of federal, state, and local regulations which influence the way they must deal with ACM in their facilities. Some of these regulations, particularly at the state and local level, may change frequently. Building owners should contact their state and local government agencies, in addition to organizations such as the National Conference of State Legislatures (NCSL), the National Institute of Building Sciences (NIBS), or EPA environmental assistance centers, for updated information on these requirements.

OSHA Regulations and the U.S. EPA Worker Protection Rule There are several important Occupational Safety and Health Administration (OSHA) and EPA regulations that are designed to protect workers. OSHA has specific requirements concerning worker protection and procedures used to control ACM. These include the OSHA construction industry standard for asbestos (29 CFR 1926.58), which applies to O & M work, and the general industry asbestos standard (29 CFR 1910.1001). State of [name of state] delegated OSHA plans, as well as local jurisdictions, may impose additional requirements.

For most operations and maintenance activities in building areas where only non-friable ACM is present or where friable ACM is in good condition, applicable OSHA permissible exposure limits are not likely to be exceeded. However, it is possible that some O & M activities will disturb ACM to such an extent that the OSHA limits are exceeded, unless good work practices are followed.

The OSHA standards and the EPA "Worker Protection Rule" requires employers to address a number of items which are triggered by exposure of employees to asbestos fibers. Exposure is discussed in terms of fibers per cubic centimeter (cc) of air. A cc is a volume approximately equivalent to that of a sugar cube.

Two main provisions of the regulations fall into the general category of "Permissible Exposure Limits (PELs)" to airborne asbestos fibers. They are:

1. 8-hour time-weighted average (TWA) limit - 0.2 fiber per cubic centimeter (f/cc) of air based on an 8-hour TWA sampling period. This is the maximum level of airborne asbestos, on average, that any employee may be exposed to over an 8-hour period (normal work shift).
2. Excursion limit (EL) - 1.0 f/cc as averaged over a sampling period of 30 minutes.

These levels trigger mandatory requirements, which include the use of respirators and protective clothing, the establishment of "regulated areas," the posting of danger signs as well as the use of engineering controls and specific work practices.

OSHA regulations also establish an "Action Level": 0.1 f/cc for an 8-hour TWA. Employee training is required once the action of 0.1 f/cc and/or the "Excursion Limit" is reached. This training must include topics specified by the OSHA rules. If an employee is exposed at or above the action level of a period of 30 days or more in a calendar year, medical surveillance is required according to OSHA construction industry asbestos standard.

OSHA also requires medical examinations under its "General Industry Standard" for any employee exposed to fiber levels in the air at or above the OSHA "action level" (0.1 f/cc) and/or the "excursion limit" (1.0 f/cc). In both cases - the action level and excursion limit - the OSHA medical examination requirement applies if the exposure occurs for at least one day per year.

The OSHA "Construction Industry Standard" (29 CFR 1926.58) for asbestos, is generally applicable for the workers who carry out the kinds of work discussed in this O & M guidance document. The OSHA construction industry asbestos standard applies to demolition and asbestos removal, enclosure or encapsulation projects, as well as to repair, maintenance, alteration, or renovation if ACM is involved. ACM spills or emergency clean-up actions are also covered by this regulation.

According to these regulations, participation in a medical surveillance program is required for any employee who is required to wear a negative pressure, air-purifying respirator. Replacement, annual, and termination physical exams are also required for these employees. However, a termination exam is only necessary under the construction industry standard (which applies to custodial and maintenance employees) if a physician recommends it. While not mandatory, EPA and NIOSH recommend physical examinations, including cardiac and pulmonary tests, for any employee required to wear a respirator by the building owner. These tests determine whether workers will be unduly stressed or uncomfortable when using a respirator.

Additional requirements of the OSHA asbestos standards, such as the use of air filtration systems and hygiene facilities, involve procedures which are most applicable to large-scale asbestos abatement projects. However, these rules also include a number of recommendations for procedures which might be appropriate for a variety of O&M programs for buildings.

Small-scale Short-duration Projects (OSHA) Appendix G of OSHA regulation 29 CFR 1926.58, discusses work practices and engineering controls for small-scale, short-duration asbestos renovation and maintenance activities. The OSHA regulation requires negative pressure enclosure and full scale decontamination when asbestos is disturbed and either the OSHA Permissible Exposure Limit or Excursion Limit is exceeded or may reasonably be expected to be exceeded. Appendix G is mandatory for small-scale, short-duration activities that exceed, or may reasonably be expected to exceed, these limits if an employer wishes to be exempt from paragraph (e)(6) (establishing a negative pressure enclosure) and paragraphs (j)(1)(i) or (j)(2)(i) (full scale decontamination) of this regulation. OSHA states that it expects the engineering and work practice controls in Appendix G to reduce asbestos exposure levels below the Action Level. OSHA has proposed in its forthcoming rule that Appendix G become mandatory for all small-scale, short-duration activities and not be based on exceedence of particular asbestos exposure levels.

Small-scale, short-duration projects are not currently precisely defined in terms of either size or duration, although their nature and scope are illustrated by examples presented in the text of the regulation. Properly trained maintenance workers may conduct these projects. Examples may include removing small sections of pipe insulation or covering for pipe repair, replacing valves, installing electrical conduits, or patching or removing small sections of drywall. OSHA issued a clarification of the definition of a "small-scale, short-duration" (SS/SD) project in a September 1987 asbestos directive. The directive focuses on intent, stating that in SS/SD projects, the removal of ACM is not the primary goal of the job. If the purpose of a small-scale, short-duration project is maintenance, repair, or renovation of the equipment or surface behind the ACM - not abatement of ACM -then the appendix provisions may apply. If the intent of the work is abatement of the ACM, then the full-scale abatement control requirements apply.

In any event, this appendix section of the OSHA construction standard outlines requirements for the use of certain engineering and work practice controls such as glovebags, mini-enclosures, and special vacuuming techniques. Similar information on these procedures may be found in the EPA's AHERA regulations for schools. (See final AHERA rule, Appendix B, for SS/SD projects.)

U.S. EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR 61 Subpart M) EPA's rules concerning the application, removal, and disposal of RACM, as well as manufacturing, spraying and fabricating of ACM, were issued under the asbestos NESHAP. The asbestos NESHAP regulation governs asbestos demolition and renovation projects in all facilities. The NESHAP rule usually requires owners or operators to have all friable ACM be removed before a building is demolished, and may require its removal before a renovation. For renovation projects where friable ACM will be disturbed, the NESHAP rule requires appropriate work practices or procedures for the control of emissions. It is prudent to note that any ACM which may become friable poses a potential hazard that should be addressed. The building owner should consider that in many instances, the removal of friable ACM prior to demolition could be less expensive than removals while the building is still occupied and being used.

Notification EPA or the state (if the state has been delegated authority under NESHAP) must be notified before a building is demolished or renovated. The following information is required on the NESHAP notice:

1. Name and address of the building owner or manager;
2. Description and location of the building
3. Estimate of the approximate amount of friable ACM present in the facility;
4. Scheduled starting and completion dates of ACM removal;
5. Nature of planned demolition or renovation and method(s) to be used;
6. Procedures to be used to comply with the requirements of the regulation; and
7. Name, address, and location of the disposal site where the friable asbestos waste material will be deposited.

The notification requirements do not apply if a building owner plans renovation projects which will disturb less than the NESHAP limits of 160 square feet (15 m^2) of friable ACM on facility components or 260 linear feet (80 m) of friable ACM on pipes (quantities involved over a one-year period). For renovation operations in which the amount of RACM equals or exceeds the NESHAP limits, notification is required as soon as possible.

Emissions Control and Waste Disposal The NESHAP asbestos rule prohibits visible emissions to the outside air by requiring emission control procedures and appropriate work practices during collection, packaging, transportation or disposal of friable ACM waste. All RACM must be kept wet until sealed in a leak-tight container that includes the appropriate label.

Note: *The information below is based on Department of Transportation (DOT) regulations and interpretations.*

DOT recently revised its hazardous material regulations (HMR; 49 CFR 171-180), and will amend it further as conditions warrant. Packaging of ACM must meet general HMR requirements and be protective, marked and labeled, except as noted below:

Small quantities: Samples over 1 ounce (30 grams) each are subject to the HMR. A "small quantity" shipment of samples is exempt from the HMR if the samples are each 1 ounce (30 grams) or less in cushioned, securely sealed and packed inner containers of plastic (at least 8 mil (0.2 mm) thick), glass, metal or earthenware. The entire, strong package must weigh 64 pounds (29 kg) or less, and be marked as required.

Limited quantities: A "limited quantity" shipment is exempt from marking if it is 66 pounds (30 kg) or less with inner packagings up to 11 pounds (5 kg) each in the strong outer packaging. It is also exempt from labeling and placarding if it is not being shipped by air.

Labeling: Packages must generally have a class 9 label, unless excepted.

Marking: Packaging, except for limited quantities, must be marked with "RQ" (for waste), "waste" or the EPA hazardous waste marking (for waste), the shipping name, UN identification number, and, usually, the consignee or consignor's name and address. See below for details.

Placards: Starting October 1, 1994, bulk packaging, freight containers, and transport vehicles must have "class 9" placards, except for "small quantity" and "limited quantity" shipments, and motor vehicle or freight container shipments less than 1001 pounds (454 kg).

Shipping limitations: Shipping "blue" or "brown" asbestos (as defined below), other than "small quantity" shipments, is forbidden from aircraft or passenger-carrying railcars, and "white" asbestos is limited to 440 pound (200 kg) shipments by such modes. The HMR defines chrysotile, actinolite, anthophyllite and tremolite asbestos as "white asbestos," crocidolite asbestos as "blue asbestos," and amosite and mysorite asbestos as "brown asbestos."

Vehicle marking: A vehicle transporting asbestos-containing waste must be marked with asbestos danger signs during loading and unloading of the waste.

Waste shipment record: The record must be completed for each shipment of ACM waste. A copy signed by the transporter must be given to the building owner or operator (e.g., maintenance or abatement contractor) when the waste leaves the building site, and a copy signed by the disposal site must be received in 45 days.

Exceptions: The HMR does not cover asbestos immersed or fixed in a binder material such as cement, plastic, asphalt, resins or mineral ore (e.g., nonfriable ACM that has not become crumbled, pulverized or reduced to powder), manufactured products containing asbestos (e.g., pipe gaskets), and shipments of less than 1 pound of friable ACM. Packaging of ACM must conform to specific requirements, but need not meet HMR performance oriented packaging specifications for Packaging Groups II and III.

Shipping papers and marks: Entries used in the hazardous material description on shipping papers and marks are:

RQ,	(Reportable Quantity, if 1 lb or more of friable asbestos)
WASTE	(For transportation of waste material, if applicable)
WHITE (or BLUE or BROWN) ASBESTOS	(Shipping name; the DOT asbestos descriptions; listed in "shipping limitations," above)
MIXTURE	(For asbestos mixed with a binder or filler, etc.)
9,	(Class 9, Miscellaneous Hazardous Materials, includes asbestos)
UN2590 (or UN2212, or UN2212)	(United Nations Identification numbers for the 3 DOT asbestos descriptions)

PG III (or II, or II),	(Packaging Groups for the 3 DOT asbestos descriptions; II and III are medium and minor; use II if mixed shipment)
LTD QTY,	(Limited quantity, if applicable)
20 OZ	(Total quantity of material described; may abbreviate unit)

When asbestos of two or more DOT descriptions are mixed in a shipment, each is listed, for example, "RQ, Waste blue and white asbestos, 9, UN2212 and UN2590, PG II, Ltd Qty, 2 lbs."

Where uncertainty exists in a particular situation, regulatory advice should be obtained.

J

Appendix J

Inspecting Buildings for Asbestos-Containing Building Materials

1. Bulk Sampling of Suspect Materials

This section covers the aspects for collecting bulk samples from suspect surfacing, thermal systems insulation (TSI) and miscellaneous materials. Also included are procedures for collecting samples, and implementing a quality assurance (QA) program.

No O&M Plan can be implemented until the presence of ACBM have been confirmed through a visual inspection of the facility, including the collection and analysis of bulk samples. In all likelihood, an inspection and survey have already been performed at facilities occupied or controlled by EPA. GSA procedures require that such an inspection, including collection and analysis of suspect ACM be performed before occupancy by federal agencies, including EPA.

Conducting an inspection and survey to identify and locate ACBM are normally performed by the building owner, but at times maybe assigned to a tenant (i.e. GSA, EPA or other federal agency) or operator of the facility. At other times, a tenant or operator may collect samples of suspect material(s) not previously sampled in the facility-wide inspection.

Asbestos School Hazard Abatement Reauthorization Act (ASHARA) regulations require that anyone collecting samples for purposes of determining the presence of asbestos must be an AHERA certified Asbestos Inspector.

AHERA inspection procedures are, by regulation, required only for schools. ASHARA requires certification and training only, not adoption of the sampling and inspection procedures.

Form and format of inspections and surveys vary greatly. All properly conducted inspections will have located and sampled all suspect surfacing, TSI and miscellaneous materials. The facility's full inspection and survey report shall be made a part of the facility's O&M Plan to clearly identify ACBM locations. The inspection report shall also

describe the condition of all asbestos materials so selection of the proper response action and O&M procedures can be implemented.

Any O&M Plan is based upon the facility's inspection and survey report. If one has not been conducted, or it is determined that the current inspection may be inadequate, conducting a proper inspection for ACBM is strongly encouraged.

2. Planning and Designing the Sampling Operation

A. Surfacing Materials

The following discussion is based largely on a portion of the EPA guidance document, Asbestos in Buildings; Simplified Sampling Scheme for Friable Surfacing Materials, (EPA 560/5-85-030a, October 1985), the "Pink Book."

Health and safety guidelines for EPA Asbestos Inspectors are included in the SMs document which is a part of this Program.

B. Identifying Sampling Areas

Group friable surfacing material into "homogeneous" sampling areas. A homogeneous area of surfacing material contains friable material that is uniform in texture and color and appears identical in every other respect. Materials installed at different times belong to different sampling areas. If there is any reason to suspect that materials might be different even though they appear uniform, assign them to separate sampling areas.

For example, material in different wings of a building, on different floors, or in special areas such as cafeterias, machine shops, bandrooms, etc., should be assigned to separate sampling areas unless there is good reason based on careful review of reliable historical construction documents to believe that the materials are identical throughout.

In a large multi-story building, a separate sampling area for each floor may not always be necessary. If the material appears identical on every floor, several floors can be grouped into one sampling area. Do not group floors if it is known that the material was applied at different times, or if there is some other reason to suspect that the material might not be homogeneous.

The selection of homogeneous sampling areas is a subjective process. When in doubt, assign materials to separate sampling areas, or collect representative samples from each and every floor or building area.

C. Preparation of Diagrams

For each sampling area, prepare a diagram approximately to scale showing all friable materials in the sampling area. Where the suspect material is only on horizontal surfaces, a to-scale floor plan could be used. A good diagrammatic floor plan, usually is an 8 1/2" x 11" size of a fire escape plan.

The sampling area diagram should include:

(1) An identification number;

(2) Brief description of the sampling area;

(3) Area dimensions and scale;

(4) Name of inspector and date of inspection; and

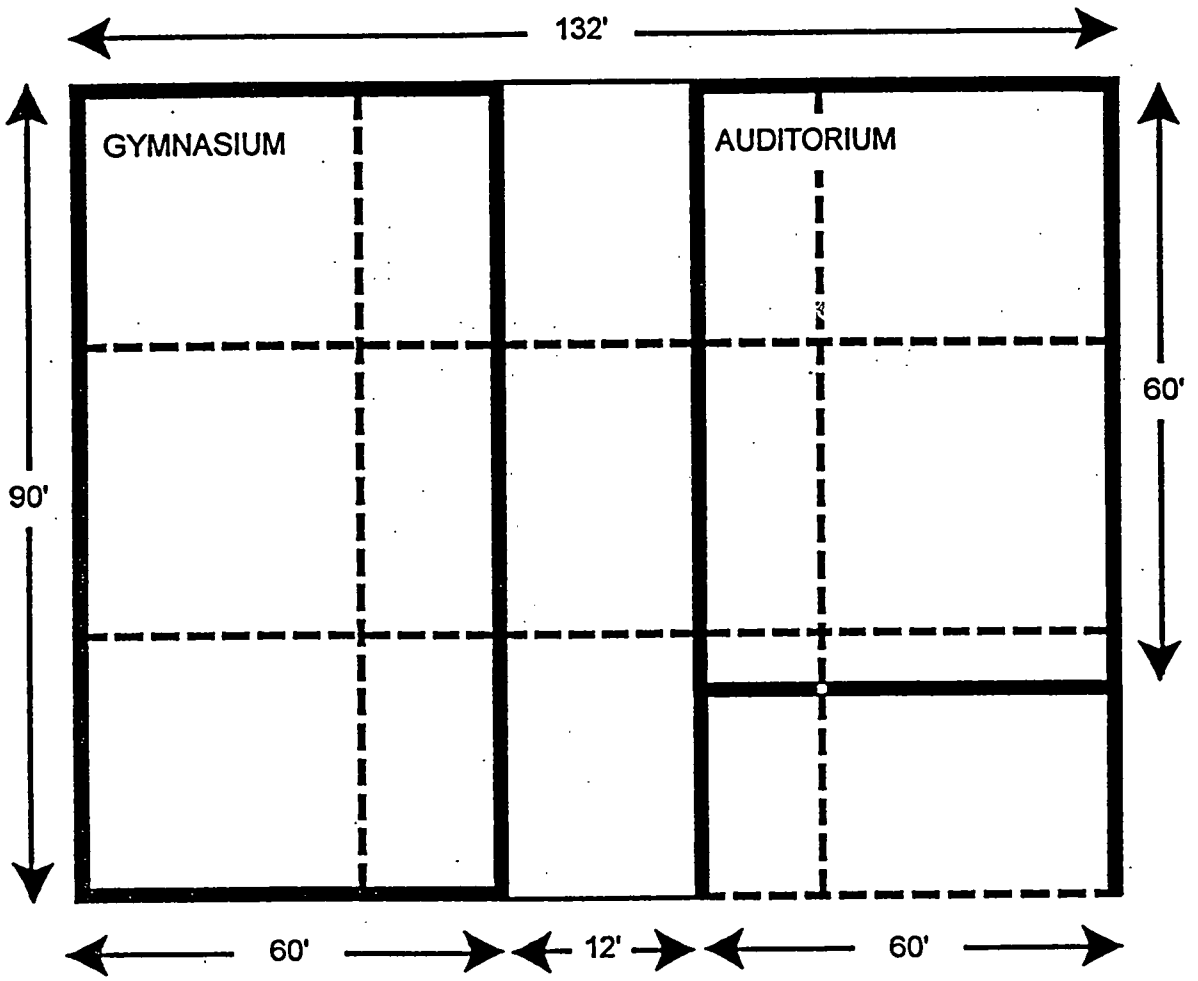
(5) Date the diagram was prepared.

If the sampling area of a large facility or single floor contains areas of friable material that are not adjacent, sketch each separate area and place all sketches on the same graph as close together as possible. The sampling area may contain areas that are not in one plane; for example, a ceiling and a wall with the same type of friable material. In this case, sketch each flat surface and place the sketches on the same graph as close together as possible. The sampling area diagrams should be retained as part of the building owner's permanent asbestos program file.

D. Number of Samples

Nine samples per homogeneous sampling area are recommended by EPA's Pink Book. With nine samples, the likelihood of detecting asbestos when it is present is very high. Cost or other constraints may limit the number of samples that can be collected. If nine samples cannot be collected, use the following table to determine the minimum number as required by the AHERA Rule. This number depends on the size of the sampling area. In a very small (much less than 1,000 square feet) sampling area such as a closet, take only three samples rather than the full nine.

EXAMPLE GRID



Facility _____

Address _____ Telephone No. _____

Inspector _____ Diagram Prepared by _____

Date of Inspection _____ Date _____

E. Selection of Sample Locations

In this sampling scheme, sample locations are selected so that they are representative of the sampling area. When nine samples are collected, they are distributed evenly throughout the sampling area. If fewer than nine samples are collected, a random sampling scheme is used to determine their location. Choosing sample locations according to personal judgment produces samples which may not be representative and can lead to a wrong decision about the presence or absence of asbestos. The sampling scheme described here helps to avoid this problem and can control the frequency of mistakes.

Divide the sampling area into nine equally sized subareas. This is done by dividing the length and breadth of the sampling area into three equal lengths and drawing a grid over the diagram; a "Tic-Tac-Toe" diagram. This can be done carefully by eye. Exact measurements are not needed.

If the sampling area does not easily fit into a rectangular shape, parts of the grid might not be in the sampling area. This is not a problem in most cases. If, however, a large part of the grid falls outside the sampling area (for example, if the sample area is L-shaped), it is advisable to divide the sampling area into two or more separate sampling areas, each of which is approximately rectangular, and select sample locations by applying the sampling scheme to each sampling area.

For greatest coverage, one sample from each of the nine regions should be collected. If fewer samples are to be collected, the random number diagrams shown on the next page will determine which subareas to use in order to follow a random sampling scheme. For very large areas, it may be advisable to locate a grid with the grid to more accurately locate the sample point.

If three or more samples are needed, take them from the subareas marked 1,2,3,4, and 5, and so on. Take samples from approximately the center of a subarea or as close as possible to the center if accessibility, presence of light fixtures, etc., make the center location impractical. If a subarea is specified that falls entirely outside the sampling area, use the next specified subarea instead. For example, if subarea three falls outside the sampling area, take the third sample from subarea 4.

For very irregular-shaped areas, the sampling area may be divided into nine subareas of approximately equal size that do not necessarily form a rectangular grid. The diagrams will then need to be adapted to the specific situation. When adapting sampling diagrams, retain the order of the numbered subareas from left to right and top to bottom whenever possible. If you have more than 18 sampling areas, start again at the top of the random numbers diagram chart to determine sampling locations for Sampling Area 19, etc.

RANDOM NUMBER DIAGRAMS

Sampling Area	Sampling Locations		
1	9	8	1
	2	7	6
	5	3	4
2	8	7	1
	3	9	5
	4	2	6
3	4	1	7
	2	9	6
	8	5	3
4	6	1	8
	5	9	3
	2	7	4
5	6	4	3
	1	5	8
	9	2	7
6	7	4	3
	6	1	5
	2	9	8

Sampling Area	Sampling Locations		
7	5	8	1
	4	3	6
	2	7	9
8	5	7	1
	6	3	4
	2	8	9
9	3	6	4
	9	2	7
	5	8	1
10	5	7	3
	8	1	6
	2	9	4
11	5	1	6
	3	4	9
	7	8	2
12	7	1	9
	2	4	5
	6	8	3

Sampling Area	Sampling Locations		
13	8	5	2
	3	6	9
	7	1	4
14	4	1	6
	3	9	7
	8	5	2
15	3	5	6
	9	2	8
	7	4	1
16	4	8	3
	2	5	9
	7	1	6
17	8	2	7
	4	5	3
	1	9	6
18	2	5	9
	6	1	8
	4	7	3

F. Identification of Samples

Assign a unique sample ID number to each sample location. This ID number will be on the sampling container when it goes to the laboratory for analysis. Record the ID number and sample location on the sampling area diagram and also on a data sheet (see **Administrative Supplies** below). This must be done carefully so that there is no uncertainty about the location and identity of each sample. Make sure that no two samples have the same ID number. Non-sequential numbers are used to prevent the laboratories from knowing which samples come from the same sampling areas or the same buildings. The "blind" procedure helps prevent bias on the part of the analyst since there is no temptation to assume that the next sample will be similar to the previous one. On the other hand, non-sequential ID numbers make organizing the analytical results by homogeneous area much more difficult. Perhaps on alpha code which identifies building and area combined with a non-sequential numerical scheme is best.

Sample ID numbers are assigned to <u>all samples</u> - surfacing, thermal system insulation and miscellaneous.

G. Thermal System Insulation Material

The concept of homogeneous sampling areas applies equally well to thermal insulation as to surfacing material. The major difference is that insulation on thermal systems is likely to be much more varied than materials on surfaces. A "typical" building may contain multiple insulated pipe runs from any combination of the following major categories:

(1) Hot water supply and/or return;

(2) Cold water supply;

(3) Chilled water supply;

Steam supply and/or return (watch for different pressure steam lines);

(1) Roof or system drain;

(2) Chemical or waste transport.

Each of these systems may have been installed or patched/repaired at different times and insulated with different materials each time. Therefore, it is best to first identify the building system in question and use this information in conjunction with the physical appearance of the insulation to delineate homogeneous sampling areas.

Each "system" may be composed of a variety of materials. For example, the following list contains nine different types of thermal insulation;

(1) Corrugated cardboard-type pipe wrap

(2) White chalky pipe wrap

(3) Fibrous glass insulation covering a pipe wrap of unknown characteristics

(4) Cementitous "mud" around pipe fittings

(5) Hard, canvas-wrapped insulation on pipe elbows

(6) Block insulation on boilers

(7) White batt insulation on boiler breeching

(8) Black batt insulation inside ducts

(9) Rope around pipe sleeves in ceiling and floor slabs

Each of these insulation types should be considered a separate component of the system, and a separate homogeneous area for sampling purposes. Fibrous glass, foam glass, rubber, and styrofoam are not suspect materials. Note, however, that they may also cover up asbestos-containing fireproofing overspray on piping systems and components.

The number of samples and the sample locations will depend on local circumstances. Take at least three samples in each sampling area. For long pipe runs or risers, more samples should be taken, especially if the piping extends to more than one functional area. Pay special attention to any change in the appearance of the insulation on long pipe runs. This would indicate a possible change in insulation type and the need to delineate a new sampling area. The AHERA Rule requires at least three random samples for thermal insulation. Exceptions are:

(1) small (less than six linear or square feet) of patched insulation (at least one sample), and

(2) areas of insulating cement (the number of samples to be determined by the Building Inspector).

Normally, samples should be collected at locations where minimal damage will be inflicted on the insulation. Choose exposed ends, damaged areas, or areas where the protective covering or jacket is missing. This is called "convenience sampling". The AHERA Rule requires random sampling. Thus, samples will have to be taken from intact insulation. Of course, the building owner always has the option of assuming the insulation contains asbestos instead of sampling and analyzing for it, and non-school facility owners are not required to exactly follow AHERA.

H. Miscellaneous Materials

Miscellaneous suspect materials are, for the most part, nonfriable (ceiling tiles are an exception). As such, sampling is more difficult and destructive. EPA does not recommend sampling these materials. Instead, they should be identified as suspect and documented as assumed asbestos products in permanent records.

Some building owners wish to have miscellaneous materials sampled and analyzed anyway. Ceiling and floor tiles are probably the most frequently sampled of materials in the miscellaneous category. If sampling is desired, try to identify separate homogeneous areas just as you would for surfacing material and thermal insulation. (You will probably find that many different types, colors, and vintages of both floor and ceiling tile can be found in a building.) Then take a convenience sample in an inconspicuous location. Very hard materials like Transite wallboard should not be sampled. Not only is sampling needlessly destructive and hazardous, Transite (or Transite-type) wallboard can easily be identified.

3. Collecting Samples

A. Personal Protective Equipment

Since inhalation of asbestos fibers during hundreds of inspection and sampling jobs may pose a serious health hazard, the use of personal protection equipment by building inspectors is crucial during the sampling process. As a minimum level of protection, Inspectors should wear a respirator, either a full or half-face mask with high efficiency disposable filter

cartridges. Full face masks will also prevent eye irritation from dust, fibers, and debris released during the sampling operation. Disposable clothing should be worn during sampling if the sampling operation is likely to dislodge pieces of suspect material or if the environment is extremely dusty (e.g., crawl space, dirty mechanical room). Inspectors should have plastic bags, twisters, and labels with them to handle the disposal of cartridges, protective clothing, wet cloths, and debris. If laboratory reports establish the presence of asbestos-containing materials, these waste materials should be disposed of as asbestos-containing wastes.

B. Sampling Equipment

Inspectors will need various tools and aids to accomplish their sampling tasks:

(1) Ladders (and sometimes man-lifts) and flashlights are needed to access areas and aid visibility;

(2) Airtight, rigid sampling containers (e.g., 35 mm film canisters);

(3) Plastic spray mister bottle(s) with water to spray the areas to be sampled;

(4) Plastic drop cloths to spread beneath the areas to be sampled;

(5) A knife, linoleum cutter, cork borer, or other tool appropriate for extracting samples;

(6) A caulking gun and compound for filling holes once a sample has been extracted;

(7) Spray acrylic or adhesive to encapsulate sample extractions;

(8) Duct tape for repairing thermal system insulation jackets;

(9) Cloths (premoistened) for cleaning up debris and tools;

(10) A vacuum cleaner equipped with high efficiency particulate air (HEPA) filters;

(11) Indelible ink pen and adhesive labels for labeling sample containers;

(12) Camera for photographic documentation; and

(13) Adhesive "dots" or labels to clearly mark the collection point with the sample number and inspector's initials.

C. Administrative Supplies

In addition to sampling area diagrams data forms for bulk samples will be needed in the field. An example data form is shown on the following page. This form is intended as guide; you will no doubt want to tailor the form to your needs and working style. Identification labels for sample containers, packing enclosure warnings and forms, plastic bags, sturdy cartons, sealing tape, and writing materials (pens, pencils, clipboard) are also needed.

Given the amount of equipment needed for bulk sampling, the inspector will likely need assistance. A push cart or table on wheels is worth considering to mobilize the inspection and sampling operation.

D. Forms

Sample collection forms follow as examples to be used by EPA workers or by outside consultants:

(1) Checklist Form

(2) Asbestos Building Survey Sheet

Building Number _____

Building Type _____

Maintenance Personnel

_____

CHECKLIST

1. Determine suspect ACBM to be sampled and devise sampling strategy? _____
2. Dimensions of building verified on drawing? _____
3. OSHA labels affixed? _____
4. Verify building wall layout? _____
5. List homogeneous materials areas? _____
6. Photograph bulk sample location(s)? _____
7. Collected bulk samples? _____
8. Note bulk sample location on field drawings? _____
9. Repair bulk sample locations? _____
10. Quantify homogeneous materials areas? _____
11. Label bulk sample locations? _____
12. Note homogeneous materials areas on field drawings? _____
13. Collect QC samples? _____
14. Note condition and assess hazard rankings? _____
15. Assign access code/homogeneous area? _____
16. Collect equipment/vacate building? _____
17. Lock building? _____
18. Return key? _____

Special Conditions - (Description – I.E. Access problems, no maintenance person, incorrect drawings, etc.)

_____

_____

Person notified _____ Total Time Involved _____

Unsafe Conditions No _____ Yes _____

Description _____

_____

Person notified _____ Time Notified _____

Total time involved _____

Inspector's signature _____ Date _____

ASBESTOS BUILDING SURVEY SHEET

INSPECTORS: _____

_____

PAGE _____ OF _____

BUILDING: _____

DATE: _____

A. ACCESS CODE

1. Exterior
2. Public
3. Service Areas
4. Crawl Space
5. Attic

B. CONDITION

1. Good
2. Fair
3. Poor

C. DAMAGE CATEGORIES

1. Air Erosion
2. Blistering
3. Delamination
4. Flaking/Dusting
5. Physical damage
6. Vibration
7. Water Damage

E. ASSESSMENT CATEGORIES (AHERA)

1. Damaged/Sign. Damaged TSI
2. Damaged friable surfacing material
3. Sign. Damaged friable surface material.
4. Damaged/Sign. Damaged friable misc.
5. Material with potential for damage.
6. Material with potential for sign. Damage.
7. Non-friable material with potential for damage/sign. Damage

D. POTENTIAL FOR DAMAGE

1. Low
2. Moderate
3. High

F. RESPONSE ACTIONS

1. O&M Program
2. Repair
3. Remove

HOMO AREA	MAT'L CODE	MATERIAL DESCRIPTION	MATERIAL LOCATION	MAT'L QTY	SAMPLE NUMBER	QC	SAMPLE LOCATION	A	B	C	D	E	F

4. Quality Assurance

Quality assurance (QA) procedures are employed to ensure reliable results for analyses of bulk samples. The first step is to choose a laboratory that is competent and reliable. Laboratories should be chosen from the list of laboratories participating in EPA's quality assurance (round robin) program.

The second step in a QA program is to monitor the performance of the laboratory where samples are being analyzed. EPA recommends that for every 20th bulk samples that is collected, a QA sample be taken immediately adjacent to the 20th samples. Thus the 20th and 21st sample of every group of 20 are side-by-side samples. Many building inspectors will collect a QA sample for every 10 samples collected for a greater degree of assurance. Laboratory analyses of these two samples are expected to closely agree. Each sample is labeled independently so that the identity of QA samples cannot be determined except by reference to records kept by the building inspector.

QA samples can be handled in one of two ways. They can be sent together with all the samples to a single laboratory for analysis. Alternatively, they can be sent to a second laboratory and analyzed independently. The first checks on analytical variability with the same label. The second checks on variability between labs. Using a second laboratory is appropriate for large studies.

Laboratory results on the QA samples should not disagree on the presence or absence of asbestos (i.e., 1% or less vs. more than 1% asbestos). If significant disagreement occurs, additional samples should be taken and analyzed before declaring the material to be or not to be asbestos-containing.

There may also be discrepancies in estimating the exact percentage of asbestos in side-by-side samples. These discrepancies are not as serious as the presence/absence result since any sample of friable material which contains more than one percent (1%) asbestos is designated as ACBM. However, the comparison of the asbestos percentage estimated by the testing laboratory/ies can provide useful information on the reliability of the analysis. Discrepancies may occur as a result of sample contamination, inconsistent procedures, differences in technique, or mistakes (e.g., mislabeling of samples). Of course, some variability in the "true" asbestos content of ACBM would be expected from one location to another. Ordinarily the percentage for each QA sample as compared with the percentage for its corresponding regular sample should not exceed ten percent (10%).

Any disagreement about the type of asbestos mineral (chrysotile, amosite, crocidolite) present should be resolved by additional analyses. Information on mineral type may be important when evaluating alternative methods of managing ACBM, especially if removal of the ACBM is under consideration.

Procedures to assure the integrity of the samples are also a component of the QA program. Strict chain-of-custody procedures should be followed.

5. Analytical Techniques for Bulk Samples

Polarized light microscopy (PLM) is the EPA-approved method for analyzing bulk materials for asbestos. This method of analysis is relatively inexpensive. PLM utilizes a light microscope equipped with polarizing filters. The identification of asbestos fiber bundles is determined by the visual properties displayed when the sample is treated with various dispersion staining liquids. Identification is substantiated by the actual structure for the fiber and the effect of polarized light on the fiber, all of which is viewed by the trained technician. The limit of detection of asbestos by PLM is about one percent (1%) by area. Samples containing lower levels of asbestos are not reliably detected by this technique.

Other analytical methods employed to detected the presence of asbestos in bulk samples include electron microscopy and infrared spectroscopy. Electron microscopy should be used to detect smaller fibers of asbestos, such as found in fine dusts or to confirm negative floor tile results. Both techniques are sometimes used to confirm the presence of asbestos in a sample analyzed by PLM, rather than as routine analytical methods.

6. Laboratory Reporting

A competent, analytical laboratory should provide a detailed bulk sample analysis report that includes the following information, at a minimum:

A. Client sample identification number;

B. Laboratory sample identification number;

C. Analytical technique used;

D. Laboratory quality control procedures;

E. Physical description of sample, as received;

F. Type(s) and estimated percentage of asbestos;

G. Types(s) and estimated percentage of non-asbestos fibers;

H. Types(s) (if known) and percentage of other components;

I. Date of analysis;

J. Analyst's signature

This information, along with data generated in the field (e.g., location of sample, type of material, photo references, etc.), should be maintained as part of an overall building inspection, recordkeeping program.

K

Appendix K

EPA Health and Safety Guidelines for EPA Asbestos Inspectors (Revised)

United States
Environmental Protection
Agency

Office of Administration
and Resources
Management

March 1991

EPA

Health and Safety Guidelines for EPA Asbestos Inspectors

(Revised)

Printed on Recycled Pa

Office of Administration
Safety, Health, and Environmental Management Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 29 1991

OFFICE OF
ADMINISTRATION
AND RESOURCES
MANAGEMENT

MEMORANDUM

SUBJECT: Revised Health and Safety Guidelines for Asbestos Inspectors

FROM: Julius C. Jimeno, Director
Safety, Health and Environmental Management Division

TO: Regional Administrators
Assistant Administrators
Laboratory Directors

The attached "Health and Safety Guidelines for EPA Asbestos Inspectors," revised in March 1991, were developed for use by EPA employees in carrying out the Agency's various missions to control asbestos exposures through inspection activities.

The two primary objectives for the Guidelines are:

- to provide for the health and safety of asbestos inspectors based on the best currently available information;
- to reduce the likelihood of significant asbestos exposures to the public through enhanced inspector guidance.

We will continue to analyze asbestos inspector health and safety issues and will develop revised guidelines in the future, as warranted.

The Safety, Health and Environmental Management Division (SHEMD), Office of Administration, is the lead office for development of these guidelines. Please keep Howard O. Wilson, Chief, Technical Assistance and Evaluation Branch or David Scott Smith, Chief, Policy and Resources Development Branch, SHEMD, advised of your experiences using the Guidelines. Your constructive comments on inspector health and safety issues are welcomed, and we encourage your input as additional experience is gained with our new guidance. Our FTS number is 382-3640.

Attachment
"Health & Safety Guidelines for EPA Asbestos Inspectors"

cc: Occupational Health and Safety Managers

Printed on Recycled Paper

HEALTH AND SAFETY GUIDELINES

FOR EPA ASBESTOS INSPECTORS

Revised March, 1991

Safety, Health and Environmental Management Division
United States Environmental Protection Agency
Headquarters
401 M Street, Southwest
Washington, District of Columbia
20460

PREFACE

These Guidelines were devloped by the Safety, Health, and Environmental Management Division for employees of the United States Environmental Protection Agency. They apply to EPA employees who manage or supervise EPA asbestos inspectors, and to EPA employees who perform asbestos inspections.

Beginning in 1989 and continuing through 1990, drafts of this document were circulated within EPA for internal review and comment. A number of changes to this document were made in response to questions and comments received from the reviewers. EPA Offices which were offered an opportunity to review and comment on the draft Guidelines included:

1) Office of Administration and Resources Management;
2) Office of Air and Radiation;
3) Office of Pesticides and Toxic Substances;
4) Office of Solid Waste and Emergency Response;
5) Office of Enforcement.

In addition, on March 4, 1991 the Environmental Assistance Division (EAD) (TS-799), Office of Toxic Substances (OTS) provided further comments about these Guidelines. In response to EAD's comments, the the following language is hereby incorporated into these Guidelines:

> "EPA recognizes that its safety and health managers, and other managers, have a responsibility to establish protective - yet practical - respiratory protection programs for their workers who engage in asbestos-related inspection activities. EPA managers are expected to: 1) ensure that EPA's asbestos inspectors and their supervisors are aware of their obligations to meet applicable OSHA requirements, and to ensure that their workers are properly trained, certified, and equipped; 2) establish respiratory protection programs for their asbestos inspectors which are consistent with the EPA asbestos program's (TS-799) policy, as described in the NIOSH/EPA "white book."
>
> EPA managers are encouraged to provide maximum levels of respiratory protection during asbestos-related work."

Questions about the Guidelines should be directed to:

Chief, Technical Assistance and Evaluation Branch
Safety, Health, and Environmental Management Division (PM-273)
United States Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460
Telephone: (202) 382-3640

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Health and Safety Guidelines for EPA Asbestos Inspectors

INTRODUCTION

These Guidelines are based on good health and safety practices and are designed to minimize the likelihood of illness or injury to EPA's asbestos inspectors. No set of guidelines can anticipate every situation or substitute for the sound judgment of properly trained professionals. However, these guidelines can be an effective tool for assuring that the Agency's mandate to conduct asbestos inspections is safely conducted.

Asbestos inspections are performed to determine compliance with environmental regulations including the National Emissions Standards for Hazardous Air Pollutants (NESHAP), Asbestos-in-School Toxic Substance Control Act (TSCA), and Worker Protection (TSCA). EPA inspectors who perform asbestos inspections may be involved in a variety of activities including: inspecting removal, demolition, distribution and abatement sites; inspecting manufacturing and fabricating operations; collecting bulk samples; inspecting emergency removals at Superfund sites; and inspecting abandoned buildings, among others.

These guidelines were prepared by the EPA's Safety, Health and Environmental Management Division (SHEMD) for EPA employees who are involved with EPA asbestos inspections. The SHEMD has no authority over contractors, contractor agents, assigns or employees; State agents, assigns or employees; or local government agents, assigns or employees in matters pertaining to asbestos exposures. However, the SHEMD encourages EPA program offices to include these Guidelines as minimum conditions of health and safety terms for contracts pertaining to asbestos inspection services, and as recommended guidelines for collaborating State and local government asbestos inspectors.

A. GENERAL REQUIREMENTS

1. Asbestos Inspector's Health and Safety Plan. A general Asbestos Inspector's Health and Safety Plan must be prepared by each EPA Regional Office and other EPA organizations involved in asbestos inspections. At a minimum, the Plan must include emergency procedures, personal protective equipment, and operational practices. The Plan must be transmitted to the appropriate safety committee for review and approval and then to the safety program manager and senior management official (e.g., the Regional Administrator) for their review and approvals.

   a. Emergency Procedures. The Plan must include procedures to be followed in: 1) medical emergencies, 2) accidental releases of asbestos, and 3) other emergency situations. For medical emergencies, the Plan must include the locations

and telephone numbers of the nearest medical emergency facilities and ambulance services. For asbestos releases, the plan must include procedures for notifying responsible building officials, as well as affected building occupants. For other emergency situations, the Plan must include provisions for identifying the emergency and non-emergency local phone numbers for the police department, the local fire department, and the nearest 24-hour poison control center. In all cases, the location of the nearest phone should be included to make the general plan site specific. The use of an inspection kit containing cards with phone numbers should be considered.

b. Personal Protective Equipment. The Plan must specify protective equipment requirements, including respiratory protection and protective clothing. The protective equipment required may vary depending on the type of inspection. For example, an inspector performing a NESHAP inspection at an abatement site may be required to wear self-contained breathing apparatus (SCBA) and a full body disposable suit. On the other hand, an inspector performing an Asbestos-in-Schools visual walk-through may not be required to wear any protective equipment because measurable exposure would be unlikely in situations in which no asbestos-containing materials (ACM) have been disturbed and where no asbestos-containing debris is present. The Plan must specify protective equipment recommendations for each type of inspection likely to be performed.

c. Operational Practices. The Plan must specify operational practices for each type of inspection likely to be performed. The operational practices may vary depending on the activities performed during the inspections.

2. Evaluation. The senior management official should assure that these Asbestos Inspectors' Health and Safety Plans are reviewed and revised as necessary at least annually.

3. Incident Reporting and Response. The appropriate program manager must coordinate the reporting and response to any incidents involving injury or illness, from asbestos for EPA's asbestos inspectors. Chapter 3 of the EPA's Occupational Health and Safety Manual details these reporting requirements and procedures [EPA #1440].

4. Training. All EPA employees engaged in asbestos-related field inspection activities must receive a minimum of 24 hours of approved basic occupational health and safety training; must accompany an experienced asbestos inspector for at least three days of directly supervised field activities; and must receive eight hours of approved, formal

refresher training annually. These, and additional requirements are described in EPA Order 1440.2, "Health and Safety Requirements for Employees Engaged in Field Activities." All EPA employees required to wear respirators must receive six hours of approved respiratory protection training, must be fit-tested at least semi-annually, and must receive approved refresher training annually, as described in EPA Order 1440.3. All EPA employees requested to enter hazardous waste sites or Superfund sites must receive the necessary training required under OSHA's regulation 29 CFR 1910.120.

5. Medical Monitoring. All EPA employees routinely engaged in field activities which are likely to result in exposure to toxic substances, or which require the use of respiratory protective equipment must be included in the Agency's Occupational Medical Monitoring Program. EPA Order 1440.2 requires that all EPA employees engaged in field activities be included in the medical monitoring program. EPA Order 1440.3 requires that all employees who wear respiratory protection be determined to be medically fit to wear respiratory protection.

6. Protective Clothing. The protective clothing needed may vary with the type of inspection and with the level of anticipated asbestos contamination. Personal protective clothing may not be needed for some inspections, such as a visual walk-through of a school where no abatement action is underway. On the other hand, a disposable suit, along with disposable gloves, head, and foot coverings may be needed where contamination of clothing is anticipated. Maneuvering into crawlspaces and inspecting asbestos removal operations inside the work area are examples of activities requiring such clothing.

After the inspection, the disposable suit, gloves, and head and foot coverings should be disposed of properly. If the site has a method for disposing of contaminated protective clothing, and the site manager agrees, disposal of contaminated clothing can be done at the site. If the site does not have an adequate method for disposing of contaminated materials, or if the site manager does not allow the EPA to dispose of materials at the site, then they must be sealed in properly labeled plastic bags and removed for proper disposal elsewhere. Disposable protective clothing must never be reused. Proper disposal of protective clothing prevents the spread of asbestos contamination to other areas.

7. Respiratory Protective Equipment. To provide asbestos inspectors with appropriate respiratory protection, respirators must be selected on the basis of the anticipated

levels of exposure that meet all OSHA requirements. When an anticipated exposure level cannot be determined, an unknown exposure condition exists. Such a situation requires the use of atmosphere supplying respirators such as a self-contained breathing apparatus (SCBA). Of currently available respiratory protective equipment, the SCBA offers the maximum level of respiratory protection.

Fortunately, much is known about the exposure conditions encountered at sites that are in compliance with current OSHA asbestos standards. When such circumstances are encountered by an inspector, they permit the initial selection o an air purifying respirator. The lowest acceptable level of respiratory protection to be used is that afforded by a NIOSH-approved full facepiece air-purifying respirator with HEPA filtration or any approved tight-fitting (i.e., having a tight face-to-facepiece seal) powered air-purifying respirator (PAPR) with High Efficiency Particulate Air (HEPA) filtration.

To assist in determining when air-purifying respirators can safely be used in conducting asbestos inspections, a study of exposure levels at renovation sites was conducted by Alliance Technology Corporation under contract to EPA. The study reviewed over 4000 air monitoring samples taken at renovation sites where, for the most part, OSHA requirements were met. It was undertaken to determine the parameters that had to be met to ensure that asbestos inspectors would be provided adequate protection when using air-purifying respirators.

The results of the study indicated that 95 percent of the time, when the OSHA asbestos standards for renovations conducted in schools, residential buildings, hospitals, offices, and industrial buildings were followed, no airborne concentrations in excess of 0.82 f/cc were present in the removal areas during active abatement i.e., the study that showed that the concentration would not exceed 0.82 f/cc 95% of the time. The data was based on Phase Contrast Microscopy (PCM) analyses. The OSHA 8-hour time-weighted-average (TWA) permissible exposure limit is 0.2 f/cc and the NIOSH-recommended exposure limit is 0.1 f/cc. Thus, before entering the envelope, if asbestos inspectors can make a determination of a project's OSHA compliance, an air-purifying respirator can be selected as shown in the following paragraph

The EPA's recommendations for respirator selections found in these Guidelines are intended to limit inspectors' exposures to asbestos to below 0.01 f/cc as an 8-hour time-weighted-average (TWA). These recommendations are based, in part, on expected inspection patterns such as not being in the envelope for more than two hours per day. The use of full facepiece air-purifying respirators or tight-fitting PAPRs

can provide such protection when used at sites that are in compliance with the OSHA asbestos standard and when inspectors spend no more than 2 hours per day inside the containment envelope. This conclusion is based on the following assumptions:

- o exposures at renovation sites that are in compliance with the OSHA asbestos standard do not exceed 2.0 f/cc more than 95% of the time (2.0 f/cc is the maximum level for which full facepiece APRs can reduce inspectors exposures to below 0.01 f/cc) lasting no more than a 2 hour exposure;

- o full facepiece air-purifying respirators (and tight-fitting PAPRs) provide a protection factor of 50X;

- o **inspectors will not be in the asbestos enclosure envelope for more than two hours per day.**

A 50X protection at a concentration up to 2.0 f/cc for two hours would result in an 8-hour TWA exposure of 0.01 f/cc. Actually, most exposures would be far less than 0.01 f/cc, since most individuals get much more than a 50X protection from full facepiece respirators (and PAPRs), and often they will not be in the envelope for two hours. Therefore, by following these recommendations, inspectors will have a high protection level because their exposure will most often be much less than 0.01 f/cc.

An abatement project's compliance with the OSHA asbestos standards can be gauged by findings that:

1) records on or off-site show that all employees have been trained as required by OSHA standards. When records are kept off-site, the inspector will request the supervisor to state that proper records exist and are available for review at a later date. [Passing an approved AHERA class is desirable but not required for buildings not covered by the AHERA regulations. Compliance with state and local training requirements should be checked.];

2) records (that can be made available at a later date) show that project employees have been given medical exams, including a determination that they are medically fit to wear respirators;

3) amended water is being used to wet the asbestos-containing material (ACM), [check to see that amended water is on-site outside the envelope];

4) no power tools are being used to remove ACM

5) the envelope is secure and no dust or debris appears to be coming from the removal area;

6) warning signs and adequately labeled containers are being used to remove the ACM;

7) a permit for disposal has been obtained from the state or local government;

8) employees are carefully removing ACM and are not dropping materials on the floor;

9) decontamination accommodations, including shower facilities, are in place;

10) existing monitoring data indicates that asbestos fibers in the work area do not exceed 2.0 f/cc as an 8-hour TWA;

11) there is a written respiratory protection program and respirators are being used;

12) a removal plan can be made available for review.

Determining that air-purifying respirators will provide adequate protection requires a certain degree of judgment. The ability to make such determinations must be obtained through both classroom and on-the-job training.

The buddy system is required in situations in which the SCBA-user is in an atmosphere that is either oxygen-deficient or is highly toxic and would be life-threatening in case of a respirator failure. Activities which would <u>not</u> result in a life-threatening or permanent injury situation would generally <u>not</u> require using the buddy system. A buddy system or appropriately outfitted assistant may be required in certain decontamination procedures. The decision to require a buddy system for decontamination would have to be made on a case-by-case-basis.

A Respirator Protection Program must be established in accordance with the OSHA standard for respiratory protection, 29 CFR 1910.134, the OSHA standards for asbestos, 29 CFR 1926.58 and 29 CFR 1910.1001, and EPA Order 1440.3 "Respiratory Protection".

Air-purifying respirators include Powered Air-Purifying Respirators (PAPR). These guidelines assume that tight-fitting PAPRs do not provide greater protection than do other air-purifying respirators due to the possibility that over-breathing (i.e., inhaling at a rate that is greater than the air supplied to the facepiece, resulting in a negative pressure in the facepiece) can occur. This guideline is based on workplace protection factors for PAPRs determined by NIOSH. This guideline

is consistent with the NIOSH Respirator Decision Logic of 1987 with respect to the protection offered by PAPRS. Additional PAPR studies are being planned by NIOSH. If they are shown to have higher protection factors in the future, appropriate changes will be made regarding selection of respiratory protection in this section.

EPA EMPLOYEES MAY NOT WEAR RESPIRATORS UNTIL THEY HAVE BEEN DETERMINED TO BE MEDICALLY FIT TO WEAR RESPIRATORY PROTECTION.

EPA EMPLOYEES SHOULD USE ONLY EPA-OWNED RESPIRATORY PROTECTIVE EQUIPMENT THAT THEY HAVE BEEN SPECIFICALLY TRAINED AND FIT-TESTED TO USE.

8. Other Personal Protective Equipment (PPE). It is recommended that eye protection be worn at all times in eye hazard areas (refer to EPA's Eye Protection Program Guidelines). Safety shoes or hard hat protection must be used where head or foot injury hazards can occur.

9. Prohibited Practices. Smoking, eating, drinking, chewing gum or tobacco, and applying makeup are prohibited in asbestos-contaminated areas.

10. Personal Hygiene. Personnel who have been in asbestos-contaminated areas must remove contaminated clothing, and other articles. Disposables should be properly bagged and discarded in landfills that are equipped to accept asbestos-containing materials. Personnel must wash their hands and faces thoroughly, or shower as appropriate. Employees should never eat, drink, apply makeup, chew gum or tobacco, or smoke before completing the decontamination process.

B. PROTECTIVE EQUIPMENT GUIDELINES FOR REMOVAL, DEMOLITION, AND RENOVATION INSPECTIONS.

EPA Asbestos Inspectors are required to inspect removal, demolition, and renovation sites under the National Emissions Standards for Hazardous Air Pollutants (NESHAP) and the Asbestos Abatement Worker Protection Rule and other regulations.

1. Protective Clothing. EPA inspectors entering a removal, demolition, or renovation area should wear the following protective clothing:

- a disposable, full-body, hooded, outer coverall (e.g., a Saranex-coated Tyvek suit or equivalent). A coverall with an expandable back should be worn when SCBA is to be used;

- a bathing suit (or equivalent) or an inner disposable coverall (when possible, particularly when a changing area or decontamination area is available, all street clothing should be removed before donning protective clothing. When clothing is removed, the inspector may choose to wear a bathing suit under the protective clothing. In situations where removing all street clothing is not possible, the inspector should roll up pants legs and sleeves and don an inner disposable coverall. The outer coverall is then worn over the bathing suit or inner coverall.);

- disposable gloves (taped to the outer coverall);

- disposable inner booties (e.g., Tyvek or equivalent);

- disposable outer booties (taped to the outer coverall).

2. Respiratory Protection. EPA inspectors entering a removal, demolition, or renovation area should select the appropriate respiratory protection according to the following locations and conditions:

a. No respiratory protection is required outside of the asbestos area-enclosing envelope when:

   - inspecting office area and other locations outside the barrier. All barrier seals must be intact, and all envelope entrances must have at least a double barrier. No visible airborne dust or debris that is potentially asbestos-contaminated should be present on any surface in the area; and

   - secondary containment is in place during glove bagging operations. The secondary containment enclosure must be complete, and for all but small-scale, short-duration operations must also be under negative pressure;

   - materials removed from the envelope have been cleaned and the pathway for removal of bags and equipment is clear and clean; and

   - all ventilation systems in the envelope are off and sealed (this does not include negative pressure systems designed for the removal project); and

   - wet methods are being used.

b. No respiratory protection is required inside the containment envelope when:

- inspecting any restricted area that has already passed an appropriate clearance test (minimum of aggressive sampling demonstrating a concentration below 0.01 f/cc by PCM);

- no removal work has begun and all ACM is intact, not disturbed, not damaged, and no debris is present.

c. Full facepiece air-purifying respirators or tight-fitting PAPRs shall be worn by inspectors when:

- inspecting outside the barrier, and workers outside the barrier are wearing air-purifying respirators;

- inspecting outside the barrier where the barrier is not complete and/or asbestos-containing debris is present;

- inspecting inside the envelope when an inspection of the operation shows it to be in compliance with the OSHA asbestos standards. If, upon entering the envelope, visible emissions are seen or other evidence suggesting non-compliance is apparent, the inspector will <u>immediately</u> leave the area. Prior to returning to the removal area to document the violations, the inspector shall don SCBA gear;

- inspecting inside the barrier and no active removal or disturbances have occurred in the past 24 hours and the inspection will not disturb any ACM.

d. Atmosphere-Supplying Respirators are required when:

- performance of the asbestos abatement project is not in accordance with OSHA standards;

- materials are being removed which are not being properly wetted, or removal causes the generation of significant levels of dust;

- monitoring data at the site show levels in excess of 2.0 f/cc, or the EPA inspection may last for more than 2 hours;

- others at the site are wearing atmosphere-supplying respirators.

C. PROTECTIVE EQUIPMENT GUIDELINES FOR ASBESTOS MANUFACTURING AND FABRICATING INSPECTIONS.

EPA asbestos inspectors are required to inspect asbestos manufacturing operations under the National Emissions Standards for Hazardous Air Pollutants (NESHAP).

1. Protective Clothing. The following protective clothing is recommended for EPA inspectors at manufacturing operations to prevent contamination of their street clothing:

- a disposable, full body, hooded coverall (e.g., a Tyvek suit or equivalent) or a disposable, full body, hooded coverall with an expandable back to cover the air tank (if SCBA is required);
- disposable shoe coverings;
- a hard hat (if applicable);
- eye protection (when respirators are not used); and
- safety shoes (if applicable).

2. Respiratory Protection. EPA inspectors at manufacturing and fabricating operations should select respiratory protection based on employers' airborne fiber monitoring data (if available at the site). For exposure levels up to 2.0 f/cc, full facepiece air-purifying respirators or tight-fitting PAPRs shall be used for up to two hours of inspection time/day. If monitoring data is not available, the site is considered to be in violation of the OSHA standards. SCBA shall be used when the inspector cannot determine that exposures are likely to remain below 2.0 f/cc during the inspection.

Situations where excessive exposures may occur include:

- loose asbestos materials are handled outside of an exhausted enclosure;
- observing the accumulation on walls or surfaces, of any debris that may consist of friable asbestos-containing materials;
- uncontrolled dumping, cutting, mixing, bagging, packaging, grinding operations or any type of fabrication where asbestos fibers may be emitted into the general air; and
- in-plant transport of friable asbestos-containing materials that are not completely sealed.

Not all situations where the potential exists for excessive emissions of asbestos can be listed. Therefore, the inspector will have to use professional judgment to determine if an air-purifying respirator will provide adequate protection.

D. PROTECTIVE EQUIPMENT AND PROCEDURAL GUIDELINES FOR COLLECTING BULK SAMPLES.

EPA asbestos inspectors are required to collect bulk samples under the Asbestos-in-Schools Rule, Asbestos Worker Protection Rule, and the National Emissions Standards for Hazardous Air Pollutants.

1. Protective Clothing. EPA inspectors should wear the following protective clothing over their street clothes when collecting bulk samples (Note: when samples can be taken without any significant chance of releasing fibers, this clothing may not be necessary. Professional judgment must be used in such unusual cases.):

- a disposable, full body, hooded coverall (e.g., a Tyvek suit or equivalent);
- eye protection (if no full facepiece respirator is used);
- disposable shoe coverings;
- hard hat (if applicable); and
- disposable gloves.

2. Respiratory Protection. EPA inspectors collecting bulk samples should wear full facepiece air-purifying respirators with HEPA filter cartridges (this includes NIOSH-approved tight-fitting PAPRs equipped with HEPA filters).

3. Procedural Guidelines. These procedural guidelines are for inspectors who collect bulk samples in non-contaminated areas (e.g., Asbestos-in-Schools inspectors). These practices should be followed to minimize fiber release and building occupant concern.

a. Preliminary Steps.

- Discuss with building officials how the samples will be obtained and the rationale for selecting the sampling locations and the number of samples.

  Also discuss the advisability of notifying employees and/or their representatives prior to the inspection.

- Determine the equipment needed during the inspection to adequately access the area, (e.g., ladders, scaffolding).

- Determine the best time to obtain the samples in each area selected (i.e., times when few people are normally in the vicinity or passing through);

- Limit access to the area while samples are being collected. Post area(s) with appropriate signs or construct barricades, if necessary. Under no circumstances should samples be taken when school children or other unprotected individuals are present;

- Determine the minimum number of people needed in the affected area during sample collection, and limit access to that number. [These individuals may need to use PPE, depending on the asbestos inspector's assessment of the potential for asbestos fiber release];

- Determine how the area will be decontaminated should there be an accident (e.g., a piece of asbestos comes loose and drops to the floor). Be prepared to isolate the area and to damp wipe/mop the area, and/or have access to a HEPA vacuum;

- Based on the best information available, determine what PPE would be required in the event of an accident, under what conditions it will be worn and by whom.

b. Sampling Procedures.

- Sampling procedures must minimize the amount of the inspector's personal exposure to the asbestos. Also, these procedures must minimize the amount of disturbance of the asbestos material.

- Don appropriate protective clothing and respiratory protective equipment.

- Before the sample is collected, place a covering on the floor under the sample collection area.

- Spray the area to be sampled with a water mist or encapsulant mist prior to sampling to minimize release of fibers (e.g., use a hand-held plant mist sprayer).

- Sampling equipment, in most cases, will consist of plastic containers or empty film canisters and a sharp instrument such as a knife or scalpel. Once the samples have been obtained, the sampling equipment must be wiped thoroughly with a damp cloth. The outsides of the film canisters must be damp-wiped before being placed into the plastic bag. Whatever is chosen to wipe the sampling equipment and sample containers must be properly disposed of in plastic bags that are properly labeled. An encapsulant should be used to seal the hole made by the inspector while extracting the sample. The sampled surface should not be left in a worse condition than before sampling was done.

c. After Sampling.

- Wet-wipe the outside of the coveralls and shoe coverings. Remove coveralls, shoe covers, and gloves and dispose of them and the wipe down cloths as asbestos-contaminated wastes.

- Spray the respirator and respirator HEPA filters with water and dispose of the filters as asbestos waste.

- Dispose of all asbestos-contaminated materials properly.

- The asbestos samples must be packaged and shipped in a manner that assures that the sample containers will not release asbestos during transportation. **[Make sure the sample vials are securely taped shut and well-cushioned to prevent breakage.]**

E. PROTECTIVE EQUIPMENT GUIDELINES FOR INSPECTING ASBESTOS WASTE DISPOSAL AND STORAGE SITES.

EPA Asbestos Inspectors are required to inspect asbestos waste disposal and storage sites under the National Emissions Standards for Hazardous Air Pollutants (NESHAP). Before entering these sites, inspectors must have completed all OSHA training required as cited in 29 CFR 1910.120.

1. Protective Clothing. EPA inspectors should wear the following protective clothing over their street clothes when inspecting asbestos waste disposal and storage sites:

- a disposable, full body, hooded coverall (e.g., Tyvek or equivalent);

- disposable gloves; and

- disposable boots.

2. Respiratory Protection. EPA inspectors at asbestos waste disposal and storage sites should select respiratory protection based on the requirements of the approved site safety plan. This assumes that an approved site safety plan has been implemented.

When no approved site safety plan is in place, the inspector must have reviewed an appropriate generic site inspection plan for the site being inspected.

The absence of a site safety plan should be reported to appropriate persons in charge and possibly to the local OSHA area office.

a. No respiratory protection is required when:

- all disposal trenches have been covered for a minimum of 24 hours, no asbestos-containing materials are visible at the disposal site.

b. Full facepiece Air-Purifying Respirators or tight-fitting PAPR should be worn when:

- trenches are being dug at the disposal site and airborne dust is not visible;

- asbestos materials are visible on the ground or floor of the site, or bags or drums containing asbestos are damaged but airborne dust is not visible; and

- inspecting a storage site, as long as airborne dust is not present.

c. Atmosphere-Supplying Respirators (e.g., SCBA or supplied air respirators (SAR) should be worn when:

- others at the site are wearing atmosphere-supplying respirators; or

- airborne dust is visible at the site.

F. PROTECTIVE EQUIPMENT GUIDELINES FOR INSPECITNG EMERGENCY REMOVAL OPERATIONS AT SUPERFUND SITES.

EPA inspectors are required to inspect emergency removals at Superfund sites under CERCLA.

1. Protective Clothing. EPA inspectors should wear the following protective clothing while inspecting emergency removal

operations at Superfund sites:

- a disposable, full body, hooded, outer coverall (e.g., a Saranex-coated Tyvek suit or equivalent). A coverall with an expandable back should be worn with SCBA;

- a bathing suit (or equivalent) or an inner, full body, inner coverall. (When possible, particularly when a changing area or decontamination area is available, all street clothing should be removed before donning protective clothing. When clothing is removed, the inspector may choose to wear a bathing suit under the protective clothing. In situations where removing all street clothing is not possible, the inspector should roll up pants legs and sleeves and don an inner disposable coverall. The outer disposable coverall is then worn over the bathing suit or inner coverall;

- disposable gloves (taped to the outer coverall);

- eye protection (when no full facepiece respirators are worn);

- disposable inner booties;

- disposable outer boots (taped to the outer coverall); and

- hard hat (if applicable).

2. Respiratory Protection. EPA inspectors at an emergency removal operation should select the appropriate respiratory protection according to the following conditions:

a. No Respiratory Protection is required when:

- in the Support Zone (i.e., the noncontaminated or clean area).

b. Air-Purifying Respirators should be worn when:

- in the Exclusion Zone or the Contamination Reduction Zone, when acceptable to the On-Scene-Coordinator (OSC) and no airborne dust is visible.

c. Atmosphere-Supplying Respirators should be worn when:

- airborne dust is visible, for example during windy conditions or during operations that disrupt the asbestos; or
- others at the site are wearing atmosphere-supplying respirators.

G. PROTECTIVE EQUIPMENT GUIDELINES FOR INSPECTING AN ABANDONED BUILDING.

1. Protective Clothing. EPA personnel should wear or carry with them the following protective clothing while inspecting an abandoned building:

- a disposable, full body, hooded coverall (e.g., a Tyvek suit or equivalent);
- disposable shoe coverings;
- eye protection (if no full facepiece respirators are worn);
- disposable gloves; and
- hard hat (if applicable).

If any suspect materials are visible on floors or surfaces, the protective clothing should be worn.

2. Respiratory Protection. EPA personnel inspecting an abandoned building should select the appropriate respiratory protection according to the following conditions:

a. No Respiratory Protection is required when:

- no suspect materials are present;
- intact suspect materials are present and no debris from those materials is observed.

b. Air-Purifying Respirators should be worn when:

- suspect materials are visible on the floors or surfaces;
- collecting bulk samples. (See Section D for specific guidelines for collecting bulk samples.)

H. OPERATIONAL PRACTICES FOR ENTERING AND EXITING SITES.

Although the operational practices in this section are aimed primarily at removal, demolition, and renovation sites, these practices can be easily modified to fit the conditions for other types of inspections.

1. Wearing an SCBA When a Three-Stage Decontamination System is Present. The three-stage decontamination system discussed here consists of a clean room, a shower area, and an equipment room (or equivalent). A detailed description of this type of

decontamination system, commonly used in the asbestos abatement industry, can be found in the OSHA asbestos regulation, 29 CFR 1926.58, Appendix F.

a. Before entering the Clean Room:

- Make sure SCBA is operating properly;

- Make sure you have all materials necessary to conduct the inspection safely (e.g., duct tape, disposable towels, protective clothing, respirator, extra plastic bags, spray bottle, etc.) All materials that must be carried into the contaminated area should be sealed in a plastic bag to minimize contamination;

- If you take a camera into the contaminated area, precautions must be taken to minimize contamination or to decontaminate the camera. Possible solutions include using a waterproof camera or sealing a conventional camera in an impermeable clear camera box. Both of these methods are used by SCUBA divers.

b. In the Clean Room:

- Remove all street clothing including socks and underwear and store them in a clean, sealed plastic bag. The bag should be placed in a secured area. If desired, don a bathing suit (or equivalent) and inner booties. [Inspectors may prefer to have the bathing suit on before going to the site.];

- With the air flow valve closed, don SCBA; let the respirator facepiece hang from the neck with the aid of a strap;

- Don disposable outer coveralls with expandable back, but do not zip it;

- Don disposable outer boots. Use duct tape to attach the boots to the legs of the outer coveralls;

- Fit the respirator facepiece to the face, tighten the facepiece straps, and check seal;

- Connect hose to regulator and turn air valve on;

- Fit the coverall hood snugly around the respirator facepiece;

- Zip up the suit;

- Don the disposable gloves. Use duct tape to attach the gloves to the sleeves of the outer coveralls;

- Proceed to the Shower Area.

c. In the Shower Area:

- Leave disposable towels (sealed in a plastic bag) near the shower.

- Proceed to the contaminated area and perform inspection.

d. Before leaving the contaminated area:

- HEPA vacuum (if possible) and wet wipe all visible debris from protective clothing. (Use a spray bottle and disposable towels to wet wipe the suit.) Proceed to the equipment room.

e. In the Equipment Room:

- Seal all contaminated nondisposable materials in a plastic bag and remove them for decontamination at a later time.

- Remove outer protective clothing including boots, gloves, and coverall and place them in a proper container for disposal.

- With SCBA, bathing suit, and inner booties still on, proceed to the Shower Room.

f. In the Shower Area:

- Thoroughly shower down with the SCBA, bathing suit, and inner booties still on. Once totally wet, remove the respirator, turn off the air supply valve, clean the respirator, and place the respirator outside the shower on the clean side;

- Continue showering. While in the shower, remove inner booties and place them in a proper container for disposal. Next, remove bathing suit, thoroughly rinse it, and place it in a plastic bag. Finish showering by thoroughly washing the entire body with soap and water;

- Proceed to the Clean Room.

g. In the Clean Room:

- Dress into street clothes. All disposables should be given to the site operator if she/he will accept them and if they will be disposed of in an approved landfill. Otherwise, place the disposables in labeled plastic bags and remove them for proper disposal.

2. <u>Wearing an SCBA When a Shower is Not Present or Available.</u>

a. Before entering the contaminated area:

- Make sure SCBA is operating properly;

- Make sure materials necessary to conduct the inspection safely (e.g., disposable towels, extra plastic bags, spray bottle, etc) are on hand. All materials that must be carried into the work area should be sealed in a plastic bag to minimize contamination;

- If a camera is to be taken into the contaminated area, precautions must be taken to minimize contamination or to decontaminate the camera. Possible solutions include using a waterproof camera or sealing a conventional camera in an impermeable box. Both of these methods are used by SCUBA divers;

- Leave all street clothing on. (Short sleeved shirts and short pants are preferable to long sleeved shirts and long pants. If wearing long pants or long sleeves, roll them up.);

- Don an inner disposable coverall and inner booties (e.g., a Tyvek suit or equivalent) over street clothes;

- With the air flow valve closed, don the SCBA; let the respirator facepiece hang from the neck with the aid of a strap;

- Don disposable outer coverall with expandable back, but do not zip it up;

- Fit the respirator facepiece to the face, tighten the facepiece straps and check face seal;

- Connect hose to regulator and turn on air valve;

- Fit the coverall hood snugly around the respirator facepiece;

- Zip up suit;

- Don the disposable gloves. Use duct tape to attach gloves to the sleeves of the outer coverall;

- Proceed to the contaminated area and perform inspection.

b. Before leaving the contaminated area:

- Standing near the exit, HEPA vacuum (if possible) and wet wipe all visible debris from the outer protective clothing. (Use a spray bottle containing water and disposable towels to wet wipe the suit; use plenty of water.) Place all disposable materials in a proper container for disposal. Standing at the doorway inside the work area, remove outer protective clothing and immediately step outside the area.

c. Outside the contaminated area:

- Once outside, thoroughly wet wipe and mist spray the SCBA and inner protective clothing. Move away from the doorway and remove the SCBA and the inner protective clothing. Place all disposable materials in a proper container for disposal.

- Seal all contaminated nondisposable materials in a plastic bag and take them with you for decontamination at a later time.

3. <u>Wearing an Air-Purifying Respirator When a Three-Stage Decontamination System is Present.</u> The three-stage decontamination system discussed here consists of a clean room, a shower area, and an equipment room (or equivalent). A detailed description of this type of decontamination system, commonly used in the asbestos abatement industry, can be found in the OSHA asbestos regulation, 29 CFR 1926.58, Appendix F.

a. Before entering the Clean Room:

- Make sure that all materials necessary to conduct the inspection safely. (e.g. duct tape, disposable towels, protective clothing, respirator, extra plastic bags, spray bottle,

etc.) have been obtained. All materials that must be carried into the contaminated area should be sealed in a plastic bag to minimize contamination;

- If a camera is to be taken into the contaminated area, precautions must be taken to minimize contamination or to decontaminate the camera. Possible methods include using a waterproof camera or sealing a conventional camera in an impermeable clear camera box. Both of these methods are used by SCUBA divers.

b. In the Clean Room:

- Remove all street clothing including socks and underwear and store them in a clean, sealed plastic bag. If desired, don a bathing suit (or equivalent) and inner booties. Inspectors may prefer to have the bathing suit on before going to the site;

- Don disposable, full body, hooded coverall. Do not put the hood on yet. Do not zip up suit, yet. Don other appropriate protective clothing. Use duct tape to attach the boots to the outer coveralls;

- Don respirator. The respirator straps should be worn under the hood. Perform positive and negative pressure checks as appropriate;

- Fit the coverall hood snugly around the respirator; zip up suit; attach gloves with duct tape;

- Proceed to the Shower Area.

c. In the Shower Area:

- Leave disposable towels (sealed in a plastic bag) near the shower.

- Proceed through the equipment room to the contaminated area and perform the inspection.

d. Before leaving the Contaminated Area:

- HEPA vacuum (if possible) and wet wipe all visible debris from protective clothing. (Use a spray bottle and disposable towels to wet wipe the suit.) Proceed to the equipment room.

e. In the Equipment Room:

- Seal all contaminated nondisposable materials in a plastic bag and remove them for decontamination at a later time;

- Remove protective clothing and place it in a proper container for disposal. Keep wearing the respirator;

- With respirator on, proceed to the shower area.

f. In the Shower Area:

- Thoroughly shower down with the respirator and bathing suit on. Remove respirator and clean it. Place it outside the shower on the clean side.

- Remove inner booties and place them in a proper container for disposal.

- Remove bathing suit, thoroughly rinse it, and place it in a plastic bag. Finish showering by thoroughly washing the entire body with soap and water.

- Dispose of towels as asbestos contaminated waste.

- Proceed to the clean room.

g. In the Clean Room

- Dress into street clothes.

- All disposables should be given to the site operator if she/he will accept them and if they will be disposed of in an approved landfill. Otherwise, place the disposables in labeled plastic bags and remove them for proper disposal.

4. Wearing an Air-Purifying Respirator When a Shower is Not Present or Available. Follow the guidelines listed in section 2, "Wearing a SCBA When a Shower is Not Present", substituting appropriate procedures for air-purifying respirators.

I. References

The following references provide additional information on the safe handling of asbestos.

1. A Guide to Respiratory Protection for the Asbestos Abatement Industry. EPA 560-OPTS-86-001, April 1986.

2. Guidance for Controlling Asbestos-Containing Materials in Buildings. EPA 560/5-85-024, June 1985.

3. Asbestos Fact Book. EPA, A-107/86-002, June 1986.

4. Guidance for Preventing Asbestos Disease Among Auto Mechanics. EPA, Office of Pesticides and Toxic Substance, Asbestos Action Program, June 1986.

5. Measuring Airborne Asbestos Following an Abatement Action. EPA 600/4-85-049, November 1985.

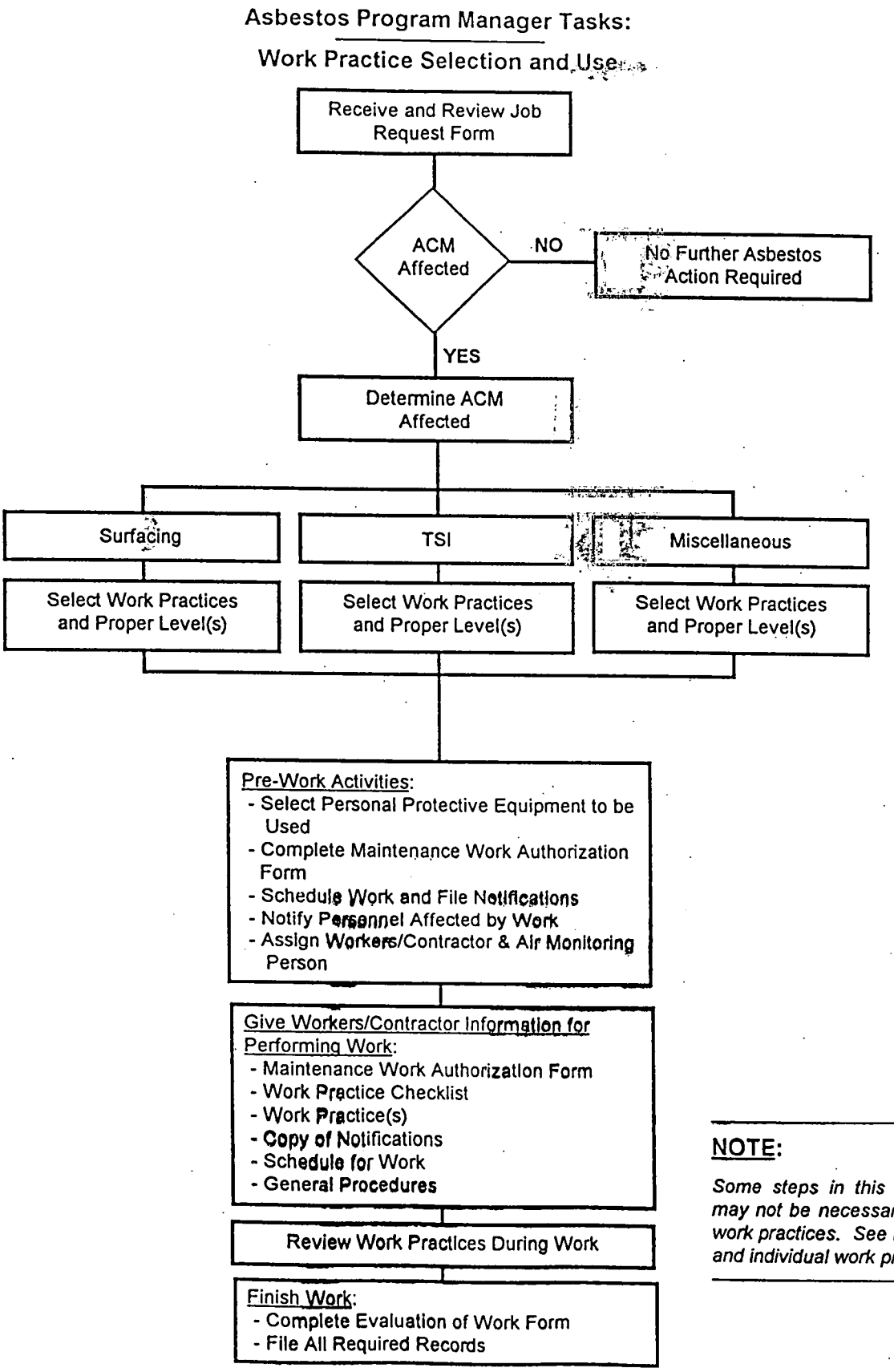
6. Guidance for Controlling Friable Asbestos-Containing Materials in Buildings. EPA 560/5-83-002, March 1983.

7. Asbestos-Containing Materials in School Buildings: A Guidance Document Parts 1 and 2. EPA

8. Quantification of Asbestos Airborne Emissions Associated with Renovation Projects. EPA Contract No. 68-02-4465 Alliance Technologies 1988 Draft Final Report.

If needed, additional appendices may be added and referenced within the report. A good example would be to add an appendix to include copies of state and local regulations. Appendices should be utilized to further inform the users of the manual of any additional reference material specific to this facility.

Figure 2: Work Practice Selection



NOTE:

Some steps in this process may not be necessary for all work practices. See Figure 2 and individual work practices.

Figure 7: Surfacing Materials Location Illustration

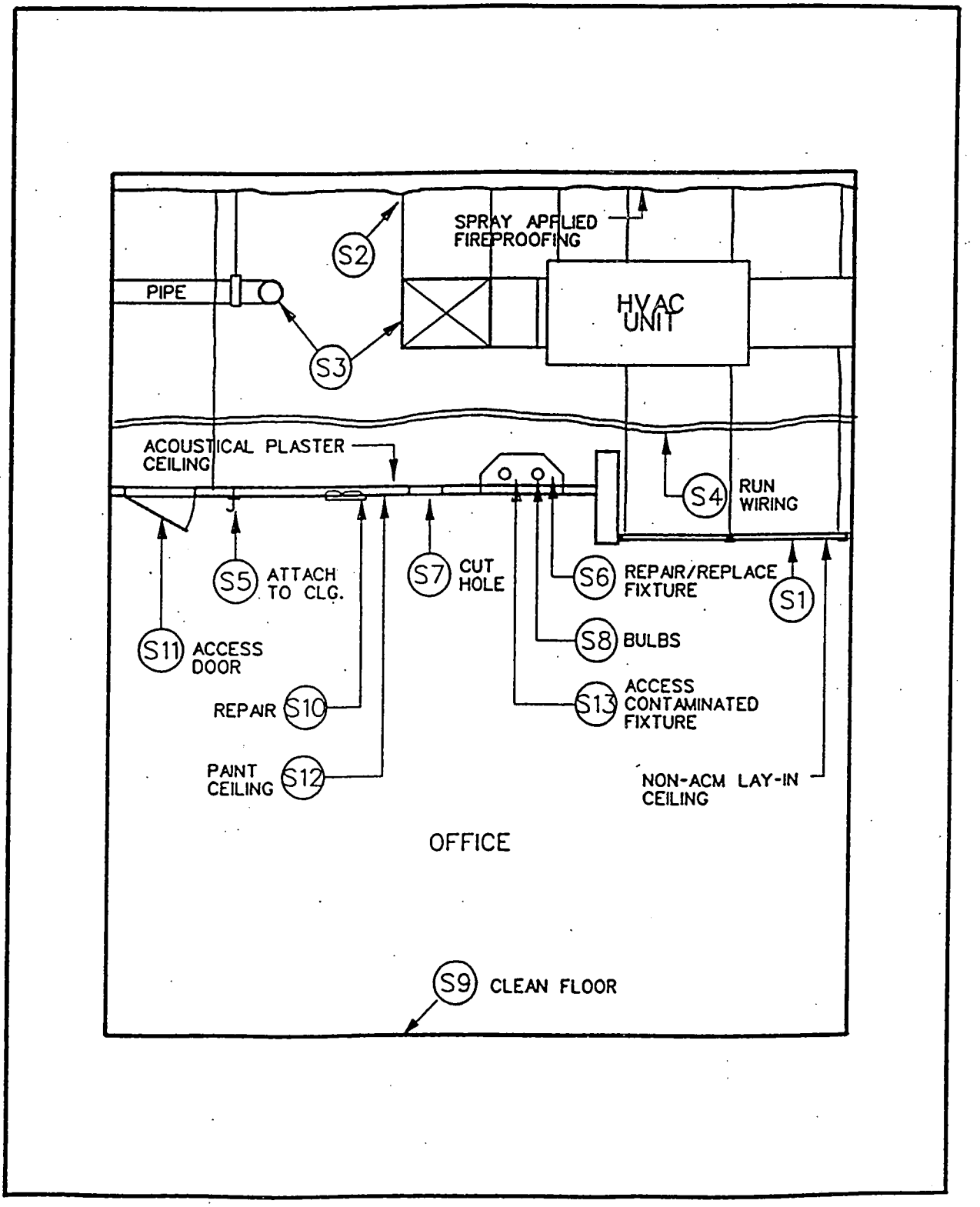


Figure 8:
Thermal Systems Insulation Location Illustration

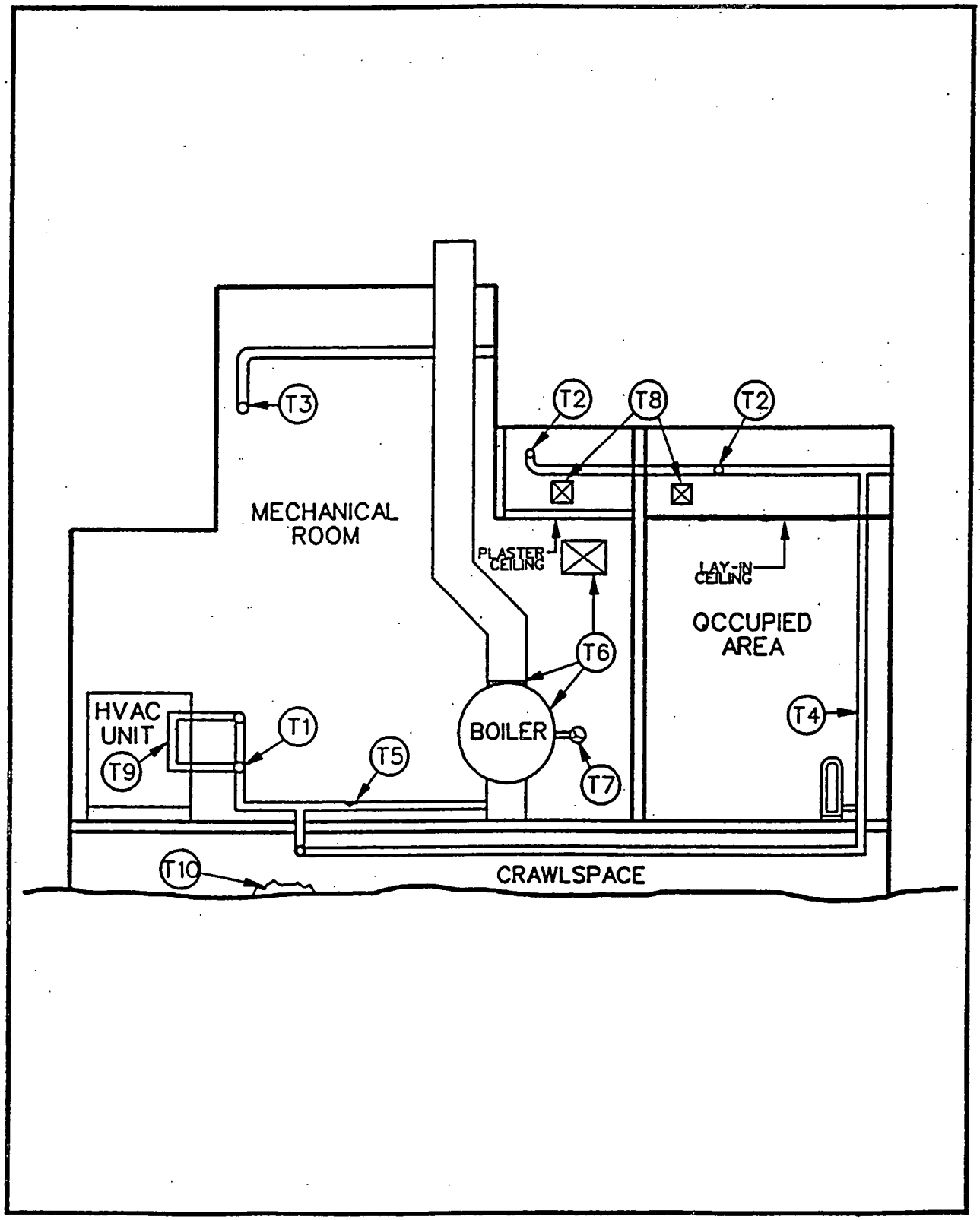
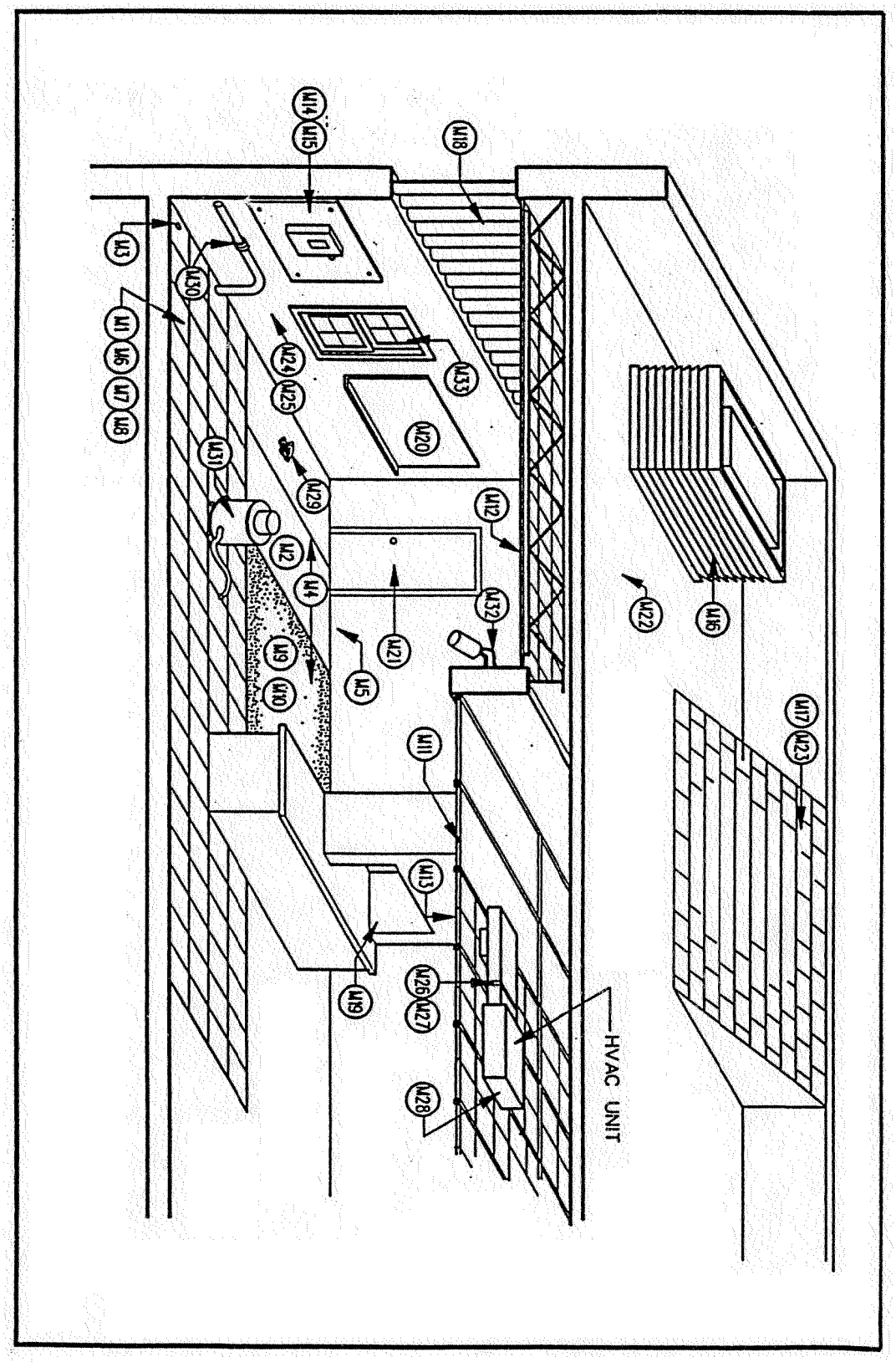



Figure 9: Miscellaneous Materials Location Illustration