

Guidance Manual

Asbestos Operations & Maintenance Work Practices

September 1992



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DISCLAIMER

The *Guidance Manual: Asbestos Operations & Maintenance Work Practices* was developed in response to a pressing national need for guidance on managing in-place asbestos. The *Guidance Manual* was drafted by a qualified independent contractor, and went through several iterations of review, modification, and refinement by a National Institute of Building Sciences (NIBS), project committee composed of representatives from a broad cross section of knowledgeable professionals from the building and environmental communities. During the review process and the subsequent ballot approval process the project committee followed consensus rules set forth in the Rules and Procedures of the NIBS Consultative Council.

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It should be noted that:

- Operations and maintenance activities involving asbestos-containing materials may involve health risks to those performing them or in proximity to the location of the work.
- Experts from the building, scientific, and environmental communities have differing views as to many aspects of proper management of in-place asbestos-containing materials. The purpose of this document is to bring together, from many sources, information and viewpoints reflecting current knowledge and technology.

The *Guidance Manual* must be considered solely as a resource document representing a consensus of expert opinion. The *Manual* does not purport to represent the views, policies, or position of the U.S. Environmental Protection Agency, the U.S. General Services Administration, or any other agency of the federal government, or any participant in the development of the document.

It is intended that the document serve as a guide for building owners, employers, managers, or others in developing asbestos O&M programs and for workers who implement such programs. It is not the purpose or burden of this document to provide all-embracing answers to every problem of managing in-place asbestos. Users bear all risks associated with reliance on these work practices and shall have the sole responsibility to evaluate the information contained herein, to form their own independent judgments on the use of the *Guidance Manual*, and to modify or adapt it as may be appropriate to specific circumstances.

PREFACE

The National Institute of Building Sciences (NIBS) is pleased to publish this document *Guidance Manual: Asbestos Operations & Maintenance Work Practices* for use by those engaged in building operations and maintenance activities involving asbestos.

The Institute would like to acknowledge the financial support provided by the U.S. Environmental Protection Agency and the U.S. General Services Administration for the development of this document and to express its appreciation for the continued assistance of these agencies.

The NIBS Board of Directors appreciates the outstanding leadership of Mr. William H. Hoffman of Questco, Inc., who served as chairman of the NIBS project committee, Richard Peduto of The Port Authority of New York and New Jersey, who served as vice-chairman, and Roger G. Morse, AIA of ENTEK Environmental & Technical Services, Inc., who served as secretary. The Institute wishes to thank Mr. Peduto, Mr. Morse and Dr. Warren Friedman, CIH of the U.S. General Services Administration who served as chairs of the three project subcommittees. Also, the Institute wishes to acknowledge the excellent professional services provided by the Institute's contractors, Steve M. Hays, P.E., CIH, and Preston H. Quirk, AIA, of Gobbell Hays Partners, Inc. Most importantly, the Institute wishes to acknowledge and thank the members of the project committee for their exceptional and untiring efforts that were necessary to carry out this assignment.

NIBS' manual was envisioned from the outset as a companion to the EPA document *Managing Asbestos In Place*, also known as the "Green Book," which describes the structure of an asbestos O&M program. This manual offers specific, detailed technical guidance to building owners, asbestos program managers, and building workers for activities that involve working near or on asbestos-containing materials. It does not quantify or explain the health risks associated with asbestos but is structured in response to the potential for exposure which might be encountered. Such a guidance manual would not have been contemplated if health risks did not exist.

It incorporates, not only the collective knowledge and experience of a broad cross-section of experts, but also the value of their unique perspectives in the building and operation management process. The procedures set forth in the manual represent a current characterization of continually evolving practices and technology. Standards and regulations for asbestos activities also continue to evolve and change. The project committee considered a broad range of issues including, compliance with federal, state, and local regulations, varied and evolving standards of care within the industry, and a variety of concerns of building owners and managers relating to economic objectives, company-specific environmental policies, and liability issues.

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I. Manual Organization



Introduction

General This *Guidance Manual: Asbestos Operations and Maintenance (O&M) Work Practices* 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 in facilities with asbestos-containing material (ACM). This manual has been prepared by a National Institute of Building Sciences' (NIBS) committee under an assistance agreement between NIBS and the U.S. Environmental Protection Agency (EPA) and the General Services Administration (GSA). The project committee has prepared the manual following the rules of the NIBS consensus process. This process provides an opportunity for representatives from all sectors of the building community to participate in the development and approval of the document.

The NIBS Consultative Council through its Operations Committee has approved the composition of the project committee for balanced representation and expertise, and has provided oversight of the project activities to insure conformance with the NIBS consensus process and has accepted the final report of the project committee.

Scope and Flexibility The work practices described in this manual are applicable to projects qualifying as "small scale, short duration" 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 asbestos-containing materials. Appendix I of this manual describes the specific requirements of OSHA Appendix G.

Projects larger than small-scale, short-duration should be performed in accordance with generally recognized asbestos control techniques, such as those described in NIBS' *Asbestos Abatement and Management in Buildings: Model Guide Specifications*. If ACM is in poor condition, O&M might not be appropriate and abatement might be necessary. These O&M work practices are not to be used for activities requiring abatement of ACM.

This manual is intended for use by an Asbestos Program Manager (APM) and trained workers. The title "Asbestos Program Manager" is used throughout; however, other titles can be used by individuals holding similar responsibilities. The manual provides checklists and step-by-step work practices which might be used by an APM and workers for performing O&M work. Because asbestos in buildings 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 manual. The project committee determined that flexibility is crucial to the efficient and cost effective completion of an O&M activity. This leaves the ultimate choice of methods to on-site

Related Documents This manual 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 ACM, 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. National Emission Standards for Hazardous Air Pollutants (NESHAP)
3. Asbestos Hazard Emergency Response Act (AHERA)

4. Asbestos Schools Hazard Abatement Reauthorization Act (ASHARA)
5. EPA Worker Protection Rule (WPR)
6. Department of Transportation's hazardous waste transportation standards

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 manual. A summary of the above listed OSHA and EPA regulations is included in Appendix I of this manual. State and local regulations, which might be the same as, equivalent to, or more stringent than federal regulations, might also apply. 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.

- 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 (personal protective equipment)
- 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 guide are grouped according to the type of asbestos-containing materials (ACM) that will be affected by the work. ACM is 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.
2. **Thermal Systems Insulation (TSI)** - pipe, boiler, tank, duct and other insulation applied to components to reduce heat loss, heat gain or condensation.
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.

The work practices in this manual are generally designed to address one material at a time. If more than one type of material is involved, work practices should be selected and used in the order in which the materials will be encountered during the work. If two (2) or more materials must be addressed at one time, the Asbestos Program Manager should develop a combined Work Practice to address the particular work situation.

When developing a combined work practice, the APM should consider the following:

1. The checklist for the *most precautionary level of work practice* should be used.
2. The work area should be prepared in accordance with the checklist for the *most precautionary level of work practice* being used.
3. Once the work area is prepared and pre-work activities are complete, the detailed work practices should be performed in the order in which materials are encountered.
4. Clean up and tear down procedures should also follow the *most precautionary level of work practice* being used.

Figure 1: Guidelines for 3 Levels of Work Practices

ITEM (General Procedure Reference)	LEVEL 1 ¹	LEVEL 2 ²	LEVEL 3 ³
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 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 ACM, building conditions, and the work to be performed. If ACM 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 ACM 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 ACM disturbance. For routine maintenance work where contact with ACM is 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 ACM is 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.

Exposure monitoring will be needed to validate that each work practice level meets the intended exposure goals. To fit within the level definitions, the following must hold true:

1. **Level 1 (NO Worker or Area Protection)** work practices should not result in elevated airborne asbestos levels.
2. **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.
3. **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.

O&M programs should always emphasize the use of "pacification" techniques such as wetting, more careful handling, local collection and local exhaust, etc. to avoid unnecessary disturbance of asbestos and the need for work area isolation. Work procedures, or modifications to these work practices, should be designed in accordance with the exposure goals of the owner and/or employer, the circumstances of the particular building, and the skill and training of the APM and workers. The only way that a work practice can be validated is to perform the procedure and monitor airborne levels during the work. Personal monitoring is required to determine if work area isolation is needed. If no disturbance of ACM will occur (such as with many Level 1 work practices), monitoring might not be required. Meaningful exposure monitoring requires sufficiently long sample

durations. Readings are not instantaneous. O&M procedures are small in scale and short in duration, requiring that many procedures be repeated a number of times to enable the collection of a sample with sufficient sensitivity.

The Air Monitoring Program developed for a specific facility needs to address how exposure monitoring will be conducted to provide data for use in the design and validation of work practices. The program should define exposure limits for both workers and the building environment.

The Phase Contrast Microscopy (PCM) air monitoring required by OSHA for exposure monitoring does not distinguish between asbestos and non-asbestos fibers and cannot measure the short or thin fibers that might be detected using Transmission Electron Microscopy (TEM). Air monitoring data for OSHA exposure might not be an accurate predictor of TEM results. Some TEM data indicate that workers might be exposed to short or thin fibers, which are not regulated by OSHA, when performing O&M activities. O&M activities might create small fibers when work such as cutting or drilling of ACM is performed. TEM analysis of clearance samples is required by the federal government under AHERA for applicable school projects involving ACM which is or becomes friable.

Portions of a report published in 1991 by the Health Effects Institute (HEI) - Asbestos Research discuss available information regarding asbestos fiber sizes and their effect on asbestos related diseases. This report also discusses the current status of surface dust sampling techniques that are used by portions of the asbestos industry to determine asbestos contamination on surfaces.

Use of O&M Work Practices

Lists of Work Practices and Work Practice Summaries

Lists of the work practices in this manual are provided in the Table of Contents 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 a Facility

The Asbestos Program Manager (APM) should select work practices from this manual that are appropriate for the facility where 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 manual 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. The O&M program could specify that some activities or work practice levels be done with in-house personnel, while other activities or levels are done by contractors. If O&M work is to be performed by contractors, the APM's responsibilities and activities might be changed to include contractual obligations, submittal reviews, and verification that O&M work and monitoring is being performed as required. Modifications to the Work Practices, APM Checklist, Worker Checklists and General Procedures might be needed.

3. Regulatory compliance issues for the specific facility and personnel who will perform the work. These include 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

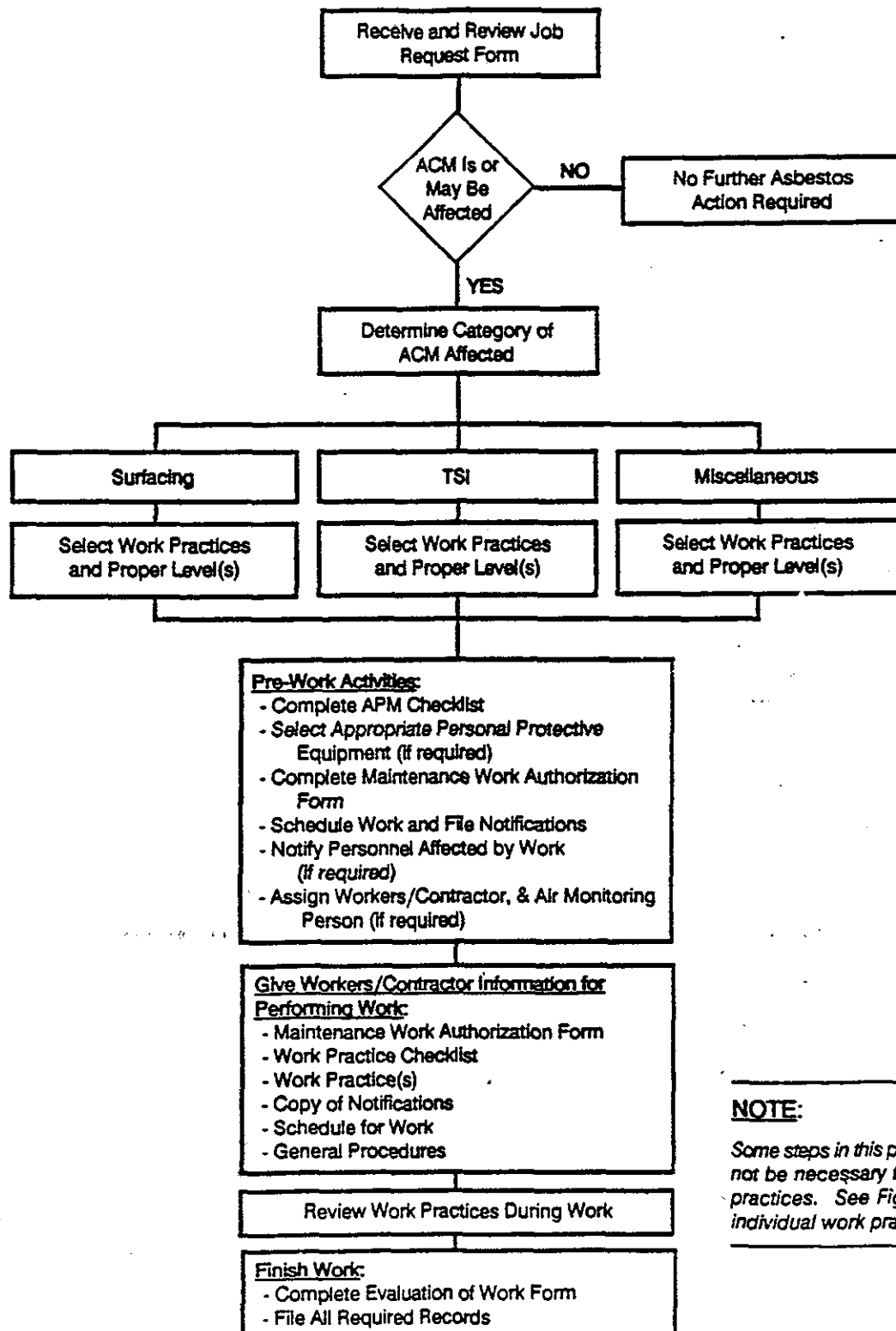
The APM will select the work practices to be used. A decision tree illustrating this selection process is shown in Figure 2. Guidance for selecting the appropriate work practice level is shown in Figure 1.

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

Figure 2: Work Practice Selection

Asbestos Program Manager Tasks:

Work Practice Selection and Use



NOTE:

Some steps in this process may not be necessary for all work practices. See Figure 1 and individual work practices.

In instances where ACM will be disturbed, OSHA requires that personal air monitoring 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 will disturb ACM 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 work practice user 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). Note also that state or local regulations may require more stringent work practices, higher levels of precaution or additional monitoring.

Number of Workers Each work practice summary includes a recommendation on how many workers are needed to perform the work. 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
- 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 work practices involving enclosures or where special conditions or other factors complicate the work. State or local regulations may dictate the number of workers needed. 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. Asbestos Program Manager **General Procedures**



Section II Asbestos Program Manager General Procedures

All references in this manual to Asbestos Program Manager (APM) refer to a person designated to perform the Asbestos Program Manager's duties. This could be the building manager, owner, or another person reporting to the APM.

The Asbestos Program Manager 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".

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

APM 1...continued

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 and local regulatory agencies concerning notification requirements for emergency work.

APM 3

Federal, State and Local Notifications The Asbestos Program Manager, or his designee, should file all notices required by federal, 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

for maintenance workers where the employer does not establish full scale negative pressure enclosures, and does not utilize full scale decontamination. State and local regulations may impose training requirements for O&M activities. Verify that 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.

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 air monitoring issues that the APM needs to address for O&M work.

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

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.

The project committee did 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 Green Book recommends that the following records of O&M work 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 ACM
- 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 guidance manual also recommends 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.

APM 9

Selection of Materials The Asbestos Program Manager should be responsible for the selection of certain materials used for O&M activities. This manual 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 (0.10 mm and 0.15 mm). State or local regulations may require that certain thicknesses or types of polyethylene be used. Two mil (0.05 mm) 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 or local regulations may have additional requirements.

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 ACM 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.

III. Worker General Procedures



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 Asbestos Program Manager (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.

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

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 - <i>See General Procedure W1 and work practice(s) item 2.</i>
	☐	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 - <i>See General Procedure W3.</i>
	☐	Vacate and secure work area, such as by locking doors and/or setting up temporary barriers - <i>See General Procedure W4.</i>
	☐	Put on respirators and perform fit checks - <i>See General Procedure W5.</i>
	☐	Put on protective clothing - <i>See General Procedure W6.</i>
Work Area	☐	Air monitoring personnel begins air monitoring work (if required) - <i>See General Procedure W7.</i>
	☐	Preclean work area if visible dust or debris is present - <i>See General Procedure W8.</i>
Work Practices	☐	Set up work area and decontamination facilities as required by work practice item 3 - <i>See General Procedure W9.</i>
Clean-Up and Tear-Down	☐	Perform work per steps in work practice(s).
	☐	Package and label asbestos waste for disposal - <i>See General Procedure W10.</i>
	☐	Apply lockdown encapsulant, where required, using garden sprayer, to surfaces where ACM was removed or disturbed - <i>See General Procedure W11.</i>
	☐	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 - <i>See General Procedure W12.</i>
	☐	Decontaminate packaged waste & move waste to outside work area - <i>See General Procedure W13.</i>
	☐	Workers decontaminate and remove protective clothing and respirators. If contaminated, dispose of protective clothing as ACM - <i>See General Procedure W14.</i>
	☐	Complete visual inspection. Complete air monitoring work - <i>See General Procedure W15.</i>
	☐	If feasible, get APM or designee to complete Evaluation of Work Form.
	☐	Transport waste to designated asbestos waste storage area - <i>See General Procedure W16.</i>
	☐	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-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.

W-6...continued

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

W-8...continued

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 ACM, 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 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.

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 ACM, the enclosure should extend to and be sealed to the ceiling or grid system. If the enclosure is below an ACM finished surface, use one of the following methods:

1. If ACM cannot be contacted, the enclosure should be separated from the ceiling by a narrow space.
2. If ACM will withstand contact without damage and is 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

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 I), (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 miosorite 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 ACM is 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 ACM.

Place protective clothing, if contaminated, into a disposal bag and label as ACM 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 ACM. 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 ACM is 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 ACM 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 ACM 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.

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 ACM is 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 ACM 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 ACM 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 ACM.

W-17...continued

procedure above) in tool pouch inside glovebag.

Place frame and glovebag assembly below work location so that frame is close to, but not touching, ACM. Location and proximity of frame to ACM should allow for some movement without disturbing ACM 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 ACM 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 ACM and frame (if possible), or add additional negative pressure device(s).

Insert hands into glove arms and wet ACM 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 ACM 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 μ m) 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. Surfacing Materials

Work Practices



Section IV Surfacing Materials Work Practices

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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.

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.
M11 - Remove asbestos-containing ceiling panels in lay-in ceiling system.
M13 - Remove asbestos-containing ceiling tiles in spline ceiling system.
M25 - Remove section of asbestos-containing drywall or plaster.

Worker Recommendations

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

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.

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 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.

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 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.

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 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.

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 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 ■ 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 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 ■ 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.

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.

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.

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.

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 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.

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 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.

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 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.

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 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.

V. Thermal Systems Insulation (TSI) Work Practices



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.

M34 ■ Level 1

Clean room that has asbestos-containing dust

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- 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.

M32 ■ Level 3

Remove asbestos-wrapped wiring

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- 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.

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.

M31 ■ Level 2

Emptying and changing filter in HEPA vacuum or changing filter in HEPA fan unit

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- 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.

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.

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.

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.

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.

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.

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 ■ 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.

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 ■ 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.

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.

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.

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.

M23 ■ Level 2...continued

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.

M23 ■ Level 1...continued

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 ■ 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.

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 be 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 disposal 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.

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.

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.

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.

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.

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.

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.

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 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.

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.

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.

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.

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
 - 26 - 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.

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.

T7 ■ Level 3...continued

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.

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.

T6 ■ Level 3...continued

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.

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.

T5 ■ Level 3...continued

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.

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.

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.

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.

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.
-

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 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.

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.

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
-

Worker

Recommendations

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

Section V. Thermal Systems Insulation (TSI) Work Practices

Work Practices	Location	Illustration	
Code	Levels	Description	
T1	2 3	Remove asbestos-containing insulation on exposed pipe for maintenance work	106
T2	2 3	Remove asbestos-containing insulation on pipe above ceiling for maintenance work	109
T3	2 3	Remove asbestos-containing insulation on exposed pipe in elevated location for maintenance work	112
T4	3	Remove asbestos-containing insulation on pipe in occupied area for maintenance work	115
T5	2 3	Repair damaged asbestos-containing insulation on a pipe	118
T6	2 3	Repair damaged asbestos-containing insulation on a boiler, duct or flue	120
T7	2 3	Install device in or access surface of asbestos-containing insulation on a pipe, boiler, duct or flue	124
T8	2 3	Remove asbestos-containing duct insulation above ceiling for maintenance work	128
T9	2 3	Remove asbestos-containing insulation inside HVAC unit for maintenance work	132
T10	2 3	Clean up asbestos-containing debris in crawlspace or tunnel	135

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.

VI. Miscellaneous Materials

Work Practices



Section VI. Miscellaneous Materials Work Practices

Work Practices	Location	Illustration	142
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M1	1 2 3	Replacement of resilient asbestos floor tiles	146
M2	1 2 3	Replacement of vinyl sheet flooring with ACM backing	152
M3	1 2 3	Penetrate resilient asbestos flooring and subfloor	159
M4	1	Install new resilient flooring or carpet over resilient asbestos flooring	163
M5	1 2	Install partition over resilient asbestos flooring	165
M6	1	Wet strip floor wax from resilient asbestos flooring	168
M7	1	Dry or spray buffing resilient asbestos flooring	170
M8	1	Cleaning resilient asbestos flooring	172
M9	1 2 3	Remove carpet over resilient asbestos flooring	174
M10	1 2	Clean potentially asbestos-contaminated carpet	178
M11	1 2 3	Remove asbestos-containing ceiling panels in lay-in ceiling system	181
M12	2 3	Remove asbestos-containing ceiling tiles attached with adhesive	185
M13	1 2 3	Remove asbestos-containing ceiling tiles in spline ceiling system	188
M14	2 3	Cut or drill asbestos cement panels	192
M15	1 2 3	Remove asbestos cement panels	195
M16	1 2	Remove asbestos cement cooling tower louvers	199
M17	1 2	Remove and replace asbestos cement roof shingles	202
M18	1 2	Remove and replace asbestos cement siding	205
M19	1 2 3	Remove high-temperature resistant (HTR) asbestos cement panels	208
M20	1 2 3	Remove asbestos-containing chalk board	212
M21	1 2 3	Remove asbestos-containing fire door and/or door hardware	216
M22	1 2	Remove asbestos-containing built-up roofing	220
M23	1 2	Remove asbestos-containing asphalt shingles	223
M24	2 3	Cut or drill asbestos-containing drywall, plaster or drywall compound	228
M25	2 3	Remove section of asbestos-containing drywall	232
M26	1 2 3	Remove asbestos-containing flexible duct connector	235
M27	1 2 3	Remove asbestos-containing ductwork taping cloth	239
M28	2	Remove contaminated filters in HVAC unit serving plenum space with exposed ACM	243
M29	1 2	Clean up debris from minor fiber release	245
M30	1 2 3	Replace asbestos-containing gaskets	248
M31	2 3	Emptying and changing filter in HEPA vacuum or changing filter in HEPA fan unit	252
M32	1 2 3	Remove asbestos-wrapped wiring	255
M33	1 2 3	Removing asbestos-containing caulking compound	259
M34	1	Clean room that has asbestos-containing dust	263

The accompanying diagram illustrates typical applications of the above work practices.

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.

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 m²)
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

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 scraper 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.*

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 ■ 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.

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.

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.

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 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.

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.

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 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 ■ 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 ■ 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 ■ 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 ■ 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 m²]) 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 m²).
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 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 m²]) 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 ■ 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.

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 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.

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 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 groove 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 ■ 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 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 ■ 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.

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 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.

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 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 ■ 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.

Appendices



Appendix A

Job Request Form for Maintenance Work

(from EPA Green Book)

Appendix B

Maintenance Work Authorization Form

(from EPA Green Book)

Appendix C

Evaluation of Work Affecting Asbestos-Containing Materials (from EPA Green Book)

Appendix D

Waste Tracking Form

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.

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 ACM 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.

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

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.

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*, Tuscon, AZ, 1989.

Health Effects Institute - Asbestos Research, *Asbestos in Public and Commercial Buildings A Literature Review and Synthesis of Current Knowledge*, Cambridge, MA, 1991.

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.)

- (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 cleating 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

- (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

- (1) 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

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

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
- (2) Removal of asbestos-containing thermal insulation not to exceed amounts greater than those which can be contained in a single glove bag.³
- (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 m²) 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 m²) 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

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 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 generally cover private sector workers, and public sector workers, and public sector employees in states which have an OSHA state plan. Public sector employees, such as city or government employees, or certain school employees, who are not already subject to a state OSHA plan are covered by the EPA "Worker Protection Rule" (Federal Register: February 25, 1987; 40 CFR 763 Subpart G, Asbestos Abatement Projects; Worker Protection, Final Rule). Note: At this time, OSHA is considering a substantial number of changes to its regulations.

The OSHA standards and the EPA Worker Protection Rule require 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

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 exceedance 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

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 myosorite 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)

Appendix J

Minority Opinions

Minority opinions by project committee members are permitted under the consensus rules of the Institute. Minority opinions must pertain to issues addressed in the members' ballot comments and be judged by the project committee to be relevant to the scope of the project. The relevant comments were evaluated at a meeting of the project committee and categorized as persuasive, non-persuasive, or editorial. The minority opinions contained herein address comments judged to be non-persuasive by the project committee. Comments judged to be persuasive and editorial have been incorporated into the text.

The project committee chairman urged dissenting members to coauthor minority opinions on the same subject. Several dissenting members chose to independently submit separate minority

opinions. NIBS staff, in the exercise of its editorial discretion, combined separately submitted minority opinions on the same subject into one common statement on that subject.

The minority opinions contained in this appendix are solely those of the authors. These statements may, or may not, represent the opinions of the organizations with which the authors are affiliated. Neither the project committee nor the Institute has verified the accuracy of facts and statements contained in the minority opinions, and furthermore none of the minority opinions represent the consensus of the project committee.

The address and telephone number of the members submitting minority opinions are listed at the end of this appendix.

**Minority
Opinion**

**James August; American Federation of
State, County and Municipal Employees**

Subject

Adequacy of the Guidance

Objection On a number of critical issues the Manual fails to provide adequate guidance and does not make recommendations essential to protect custodial and maintenance personnel, as well as other building occupants from the health risks caused by asbestos exposure.

Rationale Managing ACM in place is not always simple or inexpensive. The infrastructure to properly manage asbestos in place does not yet exist. Regulations governing O & M activities are inadequate. With the exception of schools, there are no federal requirements that buildings be inspected for asbestos or that O & M workers receive asbestos training.

Critical personnel, such as asbestos program managers, do not have to be accredited. There is an absence of a model training curriculum, oversight for training providers, and meaningful enforcement.

A number of factors can compromise the effectiveness of an O & M program; such as a lack of asbestos awareness, cost and time constraints, and reluctance to disrupt building activities.

Recommended Alternatives This Manual should err on the side of caution. The least burdensome options recommended should be fully protective of custodial and maintenance workers.

Subject

Definition Level 1 (page 8)

Objection Guidance offered is inconsistent with the definition of Level 1 regarding both training and respiratory protection.

Rationale The definition of Level 1 clearly states that disturbance of ACM is not intended. However, the possibility of unintended disturbance, with an unquantified level of exposure, is acknowledged as a distinct possibility.

The minimum training recommended by the Manual is "Awareness" training which is intended to make building service representatives recognize activities that disturb, or may disturb ACM and therefore should be avoided. Awareness training does not instruct personnel how to actually perform tasks that disturb, or may disturb ACM.

Both the EPA's "Purple Book" and "Green Book" (the companion to this Manual) state that proper respiratory protection is an integral part of all custodial and maintenance activities involving potential exposure to asbestos and that respirators be required during initial cleaning and whenever personnel come in contact with ACM.

Recommended Alternatives Maintenance and custodial staff should have O & M training for any task that disturbs, or may disturb ACM. The amount and content of the O & M training should correspond to the type of ACM to be encountered and should emphasize hands-on methods. Respiratory protection should be recommended for most situations that are now being classified as Level 1.

**Minority
Opinion**

G. William Bain; Woodmont Managements, Inc.
Sarah Hospodor; National Realty Committee

Subject

Usefulness of the Manual

Objection The recommendations are excessively complex and burdensome. The paperwork, work permit process, and checklists are too long and detailed. Many work practices have no Level 1.

Rationale Many buildings have only a part-time maintenance/custodial employee and adequate supervision may not be available to oversee the recordkeeping and training aspects of the program. Prior site inspection for routine maintenance tasks is an

unreasonable expectation. An employee on a small project is unlikely to call the APM prior to every routine task, such as removing a light fixture, for which he/she is trained and has equipment.

Recommended Alternatives Provide small building operations more flexibility to design programs that are manageable and fit realistic needs. Simplify the paperwork; limit checklists and documentation reports to one page. Recommend more Level 1 work practices.

Subject

Air Clearance for Level 3 (Figure 1, page 9)

Objection It is not necessary to perform air clearance for all Level 3 activities.

Rationale In areas where quick laboratory turn-around is not available, mini-containment cubes must be left up overnight or longer. The APM should have the flexibility to judge actual site

conditions and past experience in determining the need for clearance air sampling. Extensive data indicates that clearance sampling is not always warranted. Unnecessary expenditures of time and analytical costs will discourage good O & M practices.

Recommended Alternative: Change to "AS NEEDED".

Subject

Respiratory Protection and Protective Clothing for Level 1 (page 9)

Objection Providing maintenance workers who have been instructed to avoid disturbing ACM with respirators or protective clothing.

Rationale O & M programs calling for

outside contractors to perform all work that disturbs asbestos should not be required to provide respirators or protective clothing to in-house staff.

Recommended Alternatives Add appropriate explanatory note.

Subject

**Settled Dust Sampling (page 28).
Maintaining settled dust sampling records (page 27).**

Objection An implied recommendation to perform settled dust sampling and the suggestion that settled dust sampling records be maintained are inappropriate.

Rationale Settled dust sampling is an

experimental technology and accepted standards for interpreting results do not exist. Even the ASTM standard regarding settled dust only applies to the methods of sample collection and to methods of microscopic examination. Neither ASTM nor anyone else provides guidance

Subject

Health effects of asbestos

Objection There is no mention of health effects of asbestos and how they might relate to risk assessment in the Manual.

Rationale The purpose of the Manual is to protect health of workers. People responsible for O&M programs need health related information upon which to base decisions regarding relative risks of exposures to asbestos during the course of routine maintenance tasks. Many reports have published data that provide valuable information for assessing relative risks. One such report concluded that, at least based on currently available information, short fibers (shorter than 5 microns) have much less carcinogenic activity than longer fibers and may even be relatively inactive.

It is also important to note that the "average" maintenance person usually only infrequently performs tasks that could disturb asbestos and place the person at increased risk. Again, published data indicate that in most cases, there is a dose-response relationship to asbestos. OSHA 8-hour Time-Weighted Averages assume exposure 5 days per week. Such constant exposures are uncommon in most O&M settings which means that the relative risk is further decreased.

Recommended Alternatives Add a balanced discussion of health effects as they might relate to risk assessments for maintenance workers.

Subject

Work Practice Levels (page 8)

Objection The work practice levels do not provide meaningful guidance to users of the Manual on how to comply with the OSHA asbestos standards.

Rationale The levels are not based on OSHA standards. The levels are based on qualitative descriptions which, depending on the circumstances, may or may not correspond to the OSHA standards. With the exception of

resilient flooring and roof/siding removal work practices, the assignment of work practice levels and their examples is based on little or no air-monitoring data to determine OSHA compliance.

Recommended Alternatives The Manual should be organized to include work practice levels clearly based on the OSHA asbestos standard.

Subject

Maintenance of 0.01 fibers per cubic centimeter of air inside the respirator is common practice. (page 21)

Objection NIOSH does not have a "maximum permissible exposure limit." The statement regarding "common practice" is not based on verifiable facts. No survey was presented to indicate that such is indeed a common industrial hygiene practice.

Rationale Permissible exposure limit is an OSHA term and is misleading in this context. OSHA has set 0.1 fibers

per cubic centimeter of air as the "action level" for employee asbestos exposure in the work place.

Respiratory protection is not currently required until a fiber concentration of 0.2 fibers per cubic centimeter is reached. The PEL is measured outside the respirator. As stated, the sentence can lead to confusion. A complete discussion of this issue would be too

Recommended Alternatives Inclusion of text clearly describing the various health effects associated with exposure to asbestos. Inclusion of clear health risk warnings to workers and training

needs on this subject. This Manual should recommend that all users of the Manual receive fourteen hours of AHERA Maintenance/ Operations Training.

**Minority
Opinion**

Jim E. Lapping; The Building and Construction Trades Department, AFL-CIO
Nora Leyland; Sherman, Dunn, Cohen, Leifer & Yellig
John B. Moran and Bill Kojola; Laborers' Health & Safety Fund of North America
Scott Schneider; Occupational Health Foundation

Subject

Critical Barriers for Level 2

Objection The requirement for use of critical barriers for Level 2 work practices should be included in the "Guidelines for 3 Levels of Work Practices" (Figure 1), and the Level 2 Worker Checklist.

Rationale Critical barriers consist of putting plastic over openings through which asbestos might escape, such as windows, doorways, and HVAC vents, usually within a ten-foot radius of the work operation. Although most

Level 2 operations utilize glove bags, some do not and asbestos could easily escape through these openings. Even where glove bags are used, there is risk of escape, as glove bags can tear or leak. NIOSH, for example, recommends back-up containment during glove bag use, based on the institute's study showing the uncertainty of exposures levels when using glove bags.

Recommended Alternative Critical Barriers should be required for all Level 2 operations.

Subject

Number of Workers Recommended

Objection The Manual fails to recommend a sufficient number of workers when dry decontamination is used, and when glove bags are used.

Rationale The Manual correctly recommends a minimum of two workers in situations involving confined spaces and where mini-enclosures are used. In order to be consistent with good practice and recommendations made in the model guide specifications published by NIBS in 1988, the Manual should also recommend two workers for situations calling for dry decontamination and where glove bags are used. In addition, some jurisdictions, such as Allegheny County, Pennsylvania, require a minimum of two workers for glove bag use.

Recommended Alternative In addition to confined spaces and situations in which

mini-enclosures are used, two workers should be recommended whenever dry decontamination or glove bags are recommended. Because dry decontamination is specified for all Level 2 operations, this recommendation applies to all Level 2 work practices (except those where two workers are recommended already). The Level 2 work practices which specify a glove bag, but which do not recommend two workers are: S2, T7, M27, M30, and M31.

Rationale Many of the Level 1 work practices covering non-friable materials are limited to situations in which they do not become friable. The major objection to permitting some of these operations to be classified as Level 1, is the inherent difficulty in predicting, before a job begins, whether or the operation will disturb asbestos. It is unrealistic to expect that, once the job has begun and it is discovered that asbestos is actually being disturbed, the job will be halted and more protective measures put in place.

Recommended Alternative Our recommendation, therefore, would be to have these jobs begin as Level 2 operations, which can be downgraded to Level 1 (respirators removed, etc.), after the work has commenced and it has been

demonstrated that the material can be handled easily without damaging or disturbing the asbestos. The following work practices are covered by this recommendation: M1, M2, (Note: If the backing separates from the wear layer, this operation should absolutely not be downgraded to a Level One: the felt backing is itself a friable material; i.e., once adhered to the floor it cannot be removed, even by "non-aggressive methods," without being rendered friable), M3, M6, M9 (Note: here the operation should be Level 2 until it is established that the carpet is not adhered to resilient asbestos flooring), M11, M13, M26, M27, M30.

Subject

Explicit Limitations on the Size of Many Work Practices

Objection Many of the work practices are not explicitly limited in size or scope.

Rationale Work practices which are not explicitly limited in size and scope could easily become full scale abatement jobs done under the guise of O&M work if not so limited. Even though the Summary sheets do reference "several" or "a few" as size limitations, these restrictions are not repeated in the stand-alone work practice sheets for the various levels of operations. And, in some cases, Levels One or Two contain a size limit but Level 3 does not, with the

implication that the Level 3 operation carries no size limitation at all.

Recommended Alternatives The following work practices should carry specific size limitations in the examples given on the stand-alone work practice sheets, such as "a small area," "several" or "a few:" S1 - Levels 2 (Example B) and 3 (Example B), S10 - Level 3 (Example C), M1 - Level 2, M2 - all Levels, M3 - Level 3, M9 - all Levels, M11 - Level 3, M12 - Levels 2 and 3, M13 - Levels 2 and 3, M14 - Level 2, M15 - all Levels, M16 - Levels 1 and 2, M17 - Level 2, M18 - Level 2, and M19 - all Levels.

Subject

Definition of a disturbance of ACM

Objection The Manual fails to include ACM dust in its definition of a disturbance of ACM.

Rationale ACM dust can cause significant exposure if disturbed. Several studies have demonstrated that re-suspension of settled fibers is one of the

main sources of exposure to asbestos in buildings.

Recommended Alternatives The Manual should define a disturbance of ACM as "any activity that disrupts the matrix of ACM, or visible ACM debris or dust."

Rationale Historically, OSHA has provided exposure levels to asbestos as the basis for implementing specific requirements to protect workers, e.g. medical surveillance, training, respiratory protection, regulated areas, labeling, etc. The definition of work practice levels do not contain exposure

levels. The Manual states that the work practices are intended to assist in meeting the current OSHA regulations applicable to O&M work. The Manual actually goes beyond any relevant federal regulations and, therefore, only contributes to confusion, overreaction, and unnecessary effort and expense in the field.

**Minority
Opinion**

John Welch; Safe Buildings Alliance (SBA)

Subject

Usefulness of the Manual

Objection The Manual's work practices are excessive and complicated. Rather than setting forth simple work procedures for the variety of minor operations that typically involve asbestos-containing material (ACM) in buildings, most of the Manual's recommended practices are needlessly complicated and mirror precautions required for full-scale asbestos removal projects. The Manual will be counter-productive because its complexity is a disincentive to the use of O&M programs.

Rationale Exposure data compiled by real estate associations and SBA show that workers who perform small-scale, short-duration activities involving ACM do so infrequently and for such short periods that exposures rarely

exceed 0.1 f/cc, (the eight hour time-weighted average level that OSHA has recently proposed to reduce exposure risk during such operations). Exposure data, largely generated by OSHA, demonstrate that episodic exposures during O & M activities, and 8-hour time-weighted average exposures, are well below the current and proposed OSHA standards. In sum, these data demonstrate that asbestos exposures during O&M can be efficiently controlled through any of a variety of simple work practices.

Recommended Alternatives The usefulness of the Manual would be enhanced by the inclusion of simple, flexible work practices based on existing Occupational Safety and Health Administration (OSHA) regulations.

Subject

Work Practice Levels (page 9)

Objection The Manual's guidelines do not include work practices allowed by OSHA and do not inform users of the OSHA requirements for O&M activities involving ACM. This information is needed for the Manual to provide comprehensive advice and be an effective tool for those who make asbestos management decisions. The guidelines for three levels of work

practices omit these baseline OSHA requirements, and prescribe work practices exceeding virtually all regulatory requirements.

Rationale Inclusion of OSHA regulations in defining work practice levels would make the Manual more

Delineated Work Area (W4)	No	Yes
Respiratory Protection (W5)	No	Yes
Protective Clothing	No	Yes
Initial Monitoring (W7)	Yes	Yes
Periodic Monitoring (W7)	Only if Activity/ Process changes	Yes
Preclean (W8)	No	No
Use HEPA Vacuum (W8)	Optional	Optional
Wet Methods (W8)	If Needed to meet 0.2	Optional
Work Area Protection (W9)	Remove moveable objects	Regulated Area
Local HEPA Exhaust (W9)	Optional	Optional
Lockdown (W11)	No	No
Personal Decontamination (W14)	No	Yes
Area Decontamination	No	No
Visual Inspection (W15)	No	No
Air Clearance (W15)	No	No

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The Laborers' Health & Safety Fund of North America is a joint labor-management organization, comprised of the Laborers International Union of North America and contractors who employ members of the union, which provides technical assistance on workplace health and safety issues.

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AFL-CIO
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The BCTD represents fifteen labor unions which have over five million members working in all phases of the construction industry, including plumbers, carpenters, sheet metal workers, general laborers, electricians, iron workers, bricklayers, painters, boilermakers, plasterers, operating engineers, insulation/asbestos workers, roofers, teamsters, and elevator constructors.

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Supradur Manufacturing Corporation is a former manufacturer of asbestos-cement roofing and siding shingles. The company now manufactures their entire line of fiber-cement shingles with asbestos-free, fiber-cement technology.

Bob J. Pigg
Asbestos Information Association/North America
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AIA/NA is an incorporated/non-profit organization representing firms which manufacture, sell, or use asbestos-containing products or mine, mill, or sell asbestos fibers. AIA/NA provides industry wide information and cooperates with government agencies developing and implementing asbestos standards.

Scott Schneider, CIH
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The Occupational Health Foundation is a non-profit, labor-sponsored organization in Washington, DC which provides technical assistance to labor unions on issues of occupational safety and health.

Appendix K - Feedback Form

This form is to be used to provide comments to NIBS concerning use of the **Guidance Manual: Asbestos O&M Work Practices**. Comments and suggestions submitted will be considered during future revisions to the manual. Any relevant data derived from the use of the work practices may be submitted.

Date: _____

Comment applies to section: I II III IV V VI VII

Work Practice (if applicable): _____ Level: 1 2 3

Comment/recommendation: _____

Supporting data or information: _____

Submitted by: _____

Phone: _____

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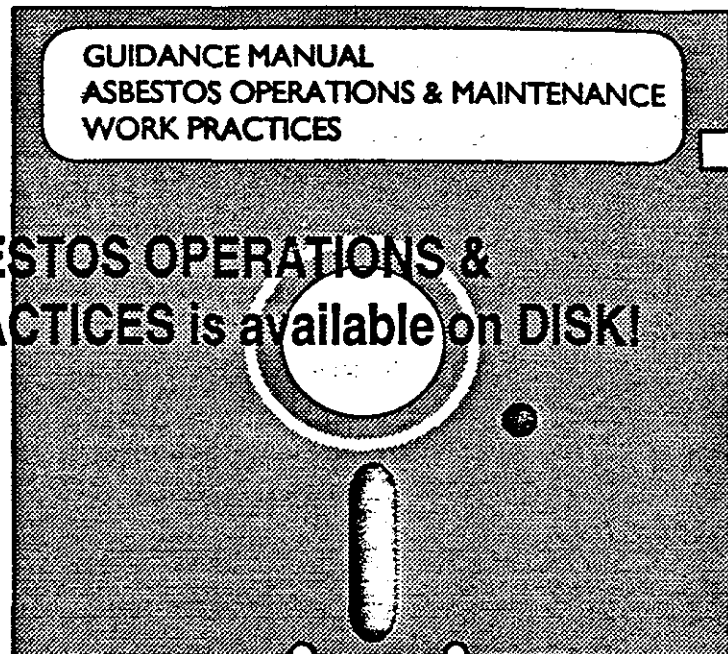
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