ENVIRONMENTAL MAINTENANCE ENGINEERS, INC.
STANDARD OPERATING PROCEDURES

Introduction

The following work practices are used by Environmental Maintenance Engineers, Inc. (EME) when removing, enclosing or encapsulating asbestos containing materials (ACMs) and presumed asbestos containing materials (PACMs). We follow the industry practice of encapsulating only non-friable ACM.

The specific operation procedures that may be used would depend on the class of asbestos work, which OSHA defines as follows:

Class I - Activities involving the removal of Thermal System Insulations TSI and surfacing ACM and PACM. Removal means all operations where ACM/PACM is taken out or stripped from structures or substrates and includes demolition operations.

Class II - Activities involving the removal of ACM which is not Thermal System Insulation or Surfacing Material. This includes, but is not limited to, the removal of asbestos-containing wallboards, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III - Activities involving "repair" and maintenance operations, where ACM, including Thermal System Insulation and Surfacing Material, is likely to be "disturbed". Repair means overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM/PACM attached to structures or substrates.

Disturbance means contact which releases fibers from ACM/PACM or debris containing ACM/PACM. This term includes activities the disrupt the matrix of ACM/PACM, render ACM/PACM friable, or generate visible debris. Disturbance includes cutting away small amounts of ACM/PACM, no greater than the amount which can be contained in one standard sized glove bag or waste bag in order to access a building component. In no event shall the amount of ACM/PACM so disturbed exceed that which can be contained in one glove bag or waste bag which shall not exceed 60 inches in length and width..

Class IV - Activities involving maintenance and custodial activities during which employees contact ACM/PACM and activities to clean up waste and debris containing ACM/PACM.

Methods of Compliance: Mandatory Practices and Procedures

Regardless of the levels of exposure, the following is required of all asbestos operations from Class I - IV:

* HEPA- filtered Vacuum Cleaners to collect all dust and debris.
* Wet methods or wetting agents during all operations EXCEPT when use is infeasible (i.e., electrical hazards, equipment malfunction, slipping hazards on sloped roof).
* Prompt clean-up & disposal of wastes and debris contaminated with asbestos in leak-tight containers.

Engineering Controls/Work Practices required to maintain airborne levels of asbestos below the PEL and Excursion Level for Classes I - IV:

* Local exhaust ventilation equipped with HEPA filter.
* Enclosure or isolation of processes producing asbestos dust.
* Ventilation of regulated area to move contaminated air away from breathing zone of workers and toward HEPA filtered devise.
* Use of other work practices and engineering controls approved by the Assistant Secretary of Labor.
* Where above practices are insufficient to reduce airborne limits, all above practices must be used and then supplemented by the use of respirators.

Prohibited Engineering Controls/Work Practices (regardless of asbestos levels):

* High-speed abrasive saws (unless equipped with HEPA filtered exhaust air system).
* Compressed air used to move asbestos (unless part of HEPA filtered air system).
* Dry sweeping, shoveling, or other dry clean-up of ACM/PACM.
* Employee rotation as a means to reduce exposure.

Worker Protection

Medical surveillance is provided at no cost to employees in compliance with OSHA 29 CFR 1926.58 requirements for initial and annual health examinations. Documentation is also obtained from the physician indicating the employee's ability to wear a respirator, and records are maintained for 30 years.

EME's asbestos abatement workers usually wear disposable coveralls, rubber boots, gloves, hard hats as required, safety glasses and respirators.

Attached please find a copy of EME's Respiratory Protection Program.

Operating Procedures for Asbestos Abatement Projects

Any work which can be performed without touching ACM/PACM such as installing Regulated Areas or isolation barriers should be performed first. All work has now been categorized into 4 classes, describing different methods of operation. These new methods of operation have been adopted by Evironmental Maintenance Engineers Inc. Each class method is to be considered our standard operating procedure.

Class I - All work must be performed inside a Regulated Area. No eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics in the Regulated Area. For all Class I jobs involving the removal of more than 25 linear or 10 square feet of thermal system insulation or surfacing materials (and for smaller jobs where a negative exposure assessment cannot be produced), one of the following practices must be used--

* Critical barriers must be placed over all openings, or
* Another barrier or isolation must be used and proven by perimeter visible surveillance and air monitoring (Air outside work area must be below EPA/AHERA clearance levels [0.01 f/cc] or at background levels).

"Class I asbestos work involves removal of surfacing materials sprayed or trowled or otherwise applied to surfaces, and removal of thermal system insulation. Surfacing materials include, for example, decorative plaster on ceiling or acoustical ACM on decking of fireproofing on structural members. TSI includes , for example, ACM applied to pipes, boilers, tanks, and ducts. Based on the record, OSHA has determined that the prevalence of these materials and their likelihood of significant fiber release when disturbed, requires vigorous control methods which OSHA has set out in the standards. For example, the stripping of 50 linear feet of TSI, which has not been positively identified as non-asbestos containing material is Class I, because it is the removal of PACM. If the TSI is stripped from a section of piping is less than 25 feet, it is still a Class I job but critical barriers may not be required if the initial exposure assessment is negative."

All Class I and II work must be supervised by a Competent Person. The Competent Person must make frequent and regular inspections of the job sites. On site inspections shall be made at least once each work shift, and any time an employee requests. These inspections should include:

- Set up enclosure/containment.
- Set up entry/exit control procedures from enclosure area.
- Supervise employee exposure monitoring.
- Ensure all employees in area wear protective clothing and respirators.
- Ensure employees set up & remove engineering controls, use work practices and personal protective equipment in compliance with requirements.
- Ensure employees use hygiene facilities & observe decontamination

procedures.
- Ensure engineering controls are working properly and employees are using proper work practices.
- Ensure notification requirements are met.

Follow the Control Methods for Class I work; Negative Pressure Enclosure System, Glove Bag System, Negative Pressure Glove Bag System, and Mini-Enclosure System.

Training requirements for Class I work states that the Comment Person must have AHERA Contractor/Supervisor or Project Designer. All Personnel involved in Class I operations must have equivalent to AHERA worker training.

Class II - All work must be performed inside of a Regulated Area. No eating, drinking, smoking. chewing tobacco or gum, or applying cosmetics in the Regulated Area. For all indoor Class II jobs where a negative exposure assessment cannot be produced, or where during job changed conditions indicate there may be exposure above the PEL or where the contractor does not remove the ACM in a substantially intact state, one of the following practices must be used--

* Critical barriers must be placed over all openings, or
* Another barrier or isolation must be used and proven by perimeter visible surveillance and area air monitoring (Air outside work area must be below EPA/AHERA clearance levels [0.01 f/cc] or at background levels).

All Class II work must follow the removal sequences suggested under Floor Tile, Roofing Materials, Cementitious ACM Siding, Shingles, Transite Panels and ACM Gaskets. For any material not specifically listed above, you must remember that:

* Materials must be thoroughly wetted.
* Materials must be removed intact unless contractor demonstrates that methods less likely to release fibers cannot be used.
* Wet waste goes immediately into waste bag upon removal.

Training requirements for Class II work states that the Competent Person must have AHERA Contractor/Supervisor or Project Designer. All personnel involved in Class II operations must have equivalent to AHERA Worker training. Exception: Class II work involving only removal of one generic category of building material (i.e., roofing, flooring, siding or transite), training can be less than AHERA 4-day Worker, but the shortened course must include OSHA specified topics plus hands on training plus the specific work practices and engineering controls applicable to that category. Minimum course length is 8 hours per specific category.

Class III - All work must be performed inside a Regulated Area. No eating, drinking smoking, chewing tobacco of gum, or applying cosmetics in the Regulated Area. Precautions must be taken for Class III work to minimize the exposure to workers and bystanders by engineering controls & work practices--

* Wet methods required.
* To extent feasible, local exhaust ventilation required.
* Where disturbance involves drilling, cutting, abrading, sanding, chipping, breaking, or sawing of thermal system insulation or surfacing materials, the contractor shall use impermeable drop cloths and shall isolate the operation using mini-enclosures of glove bags.
* For Class III jobs where a negative exposure assessment cannot be produced, or where monitoring results indicate the PEL has been exceeded, the contractor shall contain the operation using an approved control system.
* Employees performing Class III jobs which involve the disturbance of thermal system insulation or surfacing material, or where a negative exposure assessment cannot be produced, or where monitoring results indicate the PEL has been exceeded, shall wear respirators according to the provisions of this standard.

Training requirements for Class III work states that the Competent Person must have 2-Hour Asbestos Awareness and 14-Hour Operations and Maintenance training (together they are the 16-hour AHERA O&M Program; 40 CFR 763.92[a][2]).

Class IV - Work does not have to be performed inside a Regulated Area. Work consists of custodial and housekeeping operations where minimal contact with ACM/PACM may occur. This includes dusting surfaces, vacuuming carpets, mopping floors, cleaning up ACM/PACM materials from TSI or Surfacing ACM/PACM. Workers may contact ACM/PACM when performing a wide range of jobs that result in incidental disturbance, such as changing a battery in a smoke detector attached to an asbestos ceiling, polishing floors which contain asbestos, and changing a light bulb in a fixture attached to an asbestos containing ceiling.

Training requirements for Class IV work states that the Competent Person must have 2-Hour Asbestos Awareness and 14-Hour Operations and Maintenance AHERA training, except that AHERA Supervisor level is required to supervise activities to clean up waste and debris containing ACM/PACM.

Preparation of the Work Area

Prior to sealing off the work area, depending on the class of asbestos abatement work, wet clean all wall and floor surfaces. Furniture and fixtures should be cleaned with damp cloths to remove any settled visible dust. Dispose of cleaning cloths as

contaminated material. All movable furniture and light fixtures would be moved and stored in a clean area that will not interfere with subsequent work sequences. Any work should not disturb a suspended ceiling or ACM/PACM. Immovable items and sensitive items should be completely wrapped in plastic held in place by tape. Choose correct weight of plastic and tape.

Prior to erecting door and corridor barriers, move large equipment into work area.

Remove all curtains, venetian blinds, shutters, etc., from all window openings. Clean, store or dispose of as required. Seal all possible ducts or window openings with plastic and tape.

For Class I and II work, a three stage decontamination facility shall be set and used outside the work area. All workers without exception shall:

* Remove street clothes in the change room and put on disposable coveralls, head covers, and respirators prior to entering the regulated area
* remove coverall, head covers, and footwear in the work area before leaving the work area. Still wearing their respirators, workers shall proceed to the showers and remove their respirators while showering with soap and water.
* Shower at the end of each work shift prior to entering into the clean room to change into street clothes.

Because wet removal techniques are required, the project area will be surveyed to identify any potential hazards that could result from the sprayed water. Electrical outlets and equipment will be properly protected to assure the safety of maintenance personnel. Ground fault interrupters (GFIs) are required on all power sources or power cords running into the work area. All tools will be properly grounded and connected to a GFI receptacle prior to being used.

EME will provide additional lighting if specific site conditions are lacking in that area.

Drop cloths or plastic sheeting will be placed directly under the areas from which ACM/PACM will be removed and will extend sufficiently far to assure that this sheeting will catch all materials that fall during the removal process. It is important that the plastic be placed tightly into floor wall angles to reduce pull-down.

Necessary precautions will be taken to assure that asbestos fibers do not enter other areas. All portable fans will be shut off and all sources of drafts, such as air conditioning units, heating and ventilation ducts, doorways, corridors, and windows will be secured.

<u>Containment Work Area Cleaning</u>

Environmental Maintenance Engineers, Inc. uses the same procedures for cleaning whether TEM or PCM testing methods are used for clearance.

1. Gross Removal: Saturate ACM/PACM with amended water, using spray

equipment which produces a mist. Saturate the material sufficiently to wet it to the substrate without causing excessive dripping. Remove the saturated material in small sections from the areas from all areas. All visible accumulations of ACM are to be removed. ACM is not to be dropped, however chutes or slides within the containment may be used to remove materials from heights. ACM will not be allowed to dry prior to being placed in disposal bags. Contaminated material capable of puncturing the disposal bags shall be packaged separately. Brushes and other tools may be used to remove ACM from rough surfaces. In addition, if necessary the use of high pressure, low volume pressure washer may be used to clean the ACM from surfaces.

2. Daily Cleaning: Work areas will be maintained so as to be free of accumulated ACM debris. All ACM debris will be bagged and removed from the containment at the end of each work shift or day. Prior to removal from the restricted area all bagged waste shall be wet cleaned at the equipment load-out.

3. Final Cleaning: During the final clean all visible accumulations of ACM and debris shall be removed by HEPA vacuuming, wet sponging, and brushing when necessary. All surfaces within the work area shall be wet cleaned. Prior to the visual inspection EME's project foreman shall ensure that the entire work area is completely visibly clean.

4. Visual Inspection: EME's project foreman shall notify the air monitoring firm and the owner's representative of the time for the visual inspection. The visual inspection shall be signed-off by all three representatives prior to the encapsulation procedure.

5. Encapsulation: The work area shall have passed the visual inspection prior to post removal encapsulation. During encapsulation, negative pressure shall be maintained and workers within the containment area shall be in respiratory protection. An approved encapsulant shall be applied using airless spray equipment to all surfaces within the work area where ACM was removed The encapsulant shall be compatible with the replacement material per the manufacturer's recommendation. After completion of the encapsulation process, a settling period will commence where negative pressure is maintained while the encapsulant dries. Upon becoming dry or at the recommendation of the owner's representative/air monitoring firm's recommendation compliance monitoring will commence.

6. Clearance: After settling period the air monitoring firm will run aggressive air test monitoring for PCM or TEM clearance. During this phase negative pressure shall be maintained and all personnel within the containment shall use respiratory protection. After successful clearance, the containment structure may be removed and the area cleaned and prepared for reoccupancy.

Non-Containment Work Area Cleaning

1. Area Preparation: Critical barriers will be put in place for a glovebag operation and barrier tape and caution signs will be used to isolate the area for at least 25 feet on all sides if possible. A 6-mil drop cloth will be placed under the abatement operation as required.

2. Removal: Using approved, negative pressure glovebags, with workers in full protective clothing and respiratory protection set up the glovebags, test integrity, perform removal operation, remove glovebag and seal in waste disposal bag.

3. Cleaning: HEPA vacuum the work area for any residual materials and seal the exposed edges with the proper encapsulant.

4. Clearance: After completion of the work, the air monitoring firm will run PCM clearance testing. After successful clearance, the critical barriers may be removed and the area prepared for reoccupancy.

Worker Decontamination

Decontamination of workers should be performed at the end of each work shift, before meal breaks, or at any time a worker leaves the work area.

The following rules must be strictly enforced and violation will result in immediate dismissal. The worker is not permitted to eat, drink, smoke or apply cosmetics in the work area, and must pass through the entire decontamination sequence first. The worker need not be issued clean work clothes. The contaminated clothing left in the work area could be worn again.

Workers will not remove their respirators for any reason while in the work area.

Remove gross contamination (before the worker enters the contaminated equipment room).

Worker should remove any gross contamination from disposable clothing, including head and foot covers.

Remove contaminated clothing. The worker should remove all clothing including work boots, leaving respirator on. If protective clothing is disposable, dispose of in contaminated waste container provided for this purpose.

Shower. After removing clothing the worker proceeds to shower room and washes thoroughly with soap and water. The respirator is the last item to be removed after wet cleaning.

Clean respirator. The worker should maintain his own respirator, and it should be stored in locker in clean room at the work site. Disposable filters or cartridges should be disposed of as contaminated waste. Finally, the mask should be hung out to dry or wrapped in a clean plastic bag and stored in a locker.

Leave job site. The worker proceeds to the clean room to dry, dress, and leave the job site.

Equipment Decontamination

Remove any gross contamination from equipment.

Move equipment to the equipment room or wash room. Thoroughly wet-clean all surfaces of equipment.

Open up any machinery to clean out debris which may have gotten inside. Vacuum cracks and crevices as necessary.

HEPA vacuums should be emptied of their waste contents while still in the containment area. They should be taken to the equipment room and thoroughly wet-cleaned. Tape should be placed over the hose opening before being moved outside the decontamination area.

Negative air machines should be wiped off and the dirty prefilters removed while in the work area. Seal front of machine with plastic and tape prior to leaving the equipment room.

Disposal of Asbestos Containing Waste Material

1. Container Requirements: Disposal containers for asbestos containing materials will be located in such a manner that handling and movement of the asbestos materials will be minimized. All asbestos waste materials shall be disposed of in proper containers located in the work area. These containers (minimum 2 layers 6-mil plastic) shall be decontaminated prior to leaving the work area. The containers will be properly marked to meet all regulatory requirements, and labeled with the facility and operator name and address.

2. Storage Requirements: ACM waste shall be stored in a secured container while on site or removed off site to our secured warehouse container. The container shall be properly lined with 6-mil poly and labeled with the proper signs.

3. Disposal: The waste disposal site shall be a landfill authorized to accept ACM waste. The disposal facility shall adhere to all applicable regulations. Within 24

hours of arrival to the destination all ACM waste shall be buried beneath a minimum of 6" of non-asbestos-containing material.

Restore Building To Normal Use

After the final air samples are approved, the structure can be restored to its normal (or as specified) condition and use. Reverse the process used to prepare the area for the abatement. Restore power, HVAC, fixtures, furniture, etc.