

The University of Montana-Missoula  
Asbestos  
Operations and Maintenance Program

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# **1. Introduction**

This Asbestos Operations and Maintenance (O&M) Program is designed to support a consistent approach for asbestos operations and maintenance activities by providing administrative and technical procedures that: 1) protect employees, students and the general public from inadvertent exposure to hazards of asbestos-containing materials (ACM) that may arise from Facilities Services work; 2) permit the normal conduct of business while properly managing ACM in place; and 3) assure compliance with applicable regulations.

“Managing ACM in place” means that asbestos is present in many University facilities, and as long as it is not disturbed, it can remain in place and continue to do the work it was installed to do. The University’s policy of management in place relies on employees, and those who supervise them or manage their work, to be trained, aware and alert. Potential or actual asbestos hazards must be identified and addressed before starting any work that could damage or disturb asbestos-containing building materials. If damaged potential or known ACM is discovered, immediate action is required to report it to the proper authority and to control access to the area by others.

## **2. Summary and Purpose**

The O&M program applies to asbestos-containing materials (ACM) which are managed in place, as opposed to management by abatement (removal). The purpose of the O&M Program is to define a course of action aimed at safeguarding the health of University employees, students, and visitors by maintaining ACM in a stable condition, thereby preventing deterioration or damage that can result in the release of asbestos fibers.

Specifically, the four directives that have been established to accomplish this objective are to:

1. MAINTAIN ACM in good condition.
2. ENSURE proper cleanup of release of asbestos fibers.
3. PREVENT further release of fibers.
4. MONITOR the condition of ACM on campus.

The O&M Program is a major component of the overall University Asbestos Management Plan. It provides a system of surveillance, control, and work practices that apply specifically to O&M activities. These procedures are used in conjunction with other elements of the Asbestos Management Plan, such as notification, training, and record keeping.

## **3. Program Components**

- a. Surveillance. Awareness level trained crafts personnel will perform regular surveillance of ACM to note, assess, and document any changes in the condition of the materials. This

includes a visual, and if necessary tactile, re-inspection of known ACM as encountered. The UM Asbestos Inspector will also perform supplemental periodic air monitoring based on O&M report, assessed priorities, and in the event of fiber release episodes.

- b. **Work Control.** Work orders that have potential for disturbing ACM due to proximity to the material or the nature of work performed, and pertinent information received from maintenance staff, will be identified with a “Asbestos Risk” notation for the supervisor to review before assigning work.
- c. **Work Practices.** Work practices for custodial, maintenance, and trade workers will be tailored to the likelihood that ACM may be disturbed and fibers released. Four categories of O&M work practices are involved.
- d. **Worker protection programs.** These include the UM Respiratory Protection Program, personal and area air sampling, use of appropriate personal protective equipment, and most importantly, administrative and engineering controls where feasible.

## 4. Definitions

**Aggressive method:** Removal or disturbance of building material by sanding, abrading, grinding or other method that breaks, crumbles, or disintegrates intact ACM.

**AHERA:** Asbestos Hazard Emergency Response Act. EPA regulations (40 CFR Part 763) covering management of asbestos in **KS12 schools**. AHERA requires that education agencies periodically inspect the condition of asbestos materials in schools and share their findings with the parents of their students.

**Asbestos:** A naturally occurring mineral that is mined throughout the world in countries such as the China, Canada, South Africa, Russia and Australia. The most common types of Asbestos (chrysotile, amosite and crocidolite) are removed from the ground and then processed for automobile brakes, floor tiles, pipe and duct insulation, decorative plasters, spray-on fire proofing and a wide range of other products.

**Asbestos-containing material (ACM):** Any material containing more than one percent asbestos. See Appendix A for a sample list of ACMs.

### **Asbestos Program Manager (APM):**

1. Maintains the Asbestos Management Program and revise as necessary.
2. Coordinates necessary asbestos training for UM staff.
3. Conduct asbestos identification activities.
4. Maintains records of all building surveys, material sampling, training, abatement activities, air monitoring, and negative exposure assessments.
5. Provides technical review of project design and specifications for asbestos abatement on “Major” and “Minor” projects.
6. Investigates asbestos concerns of students, faculty, staff, contractors, building occupants, and visitors.
7. Periodically monitors activities at asbestos abatement job sites for compliance to

- applicable regulations. See Appendix B for a summary regulatory overview.
8. Reviews State of Montana project notifications.
  9. Reviews regulatory variance requests from contractors and consults with Montana State ACP for approval.
  10. Meets with all regulatory agencies as needed for inspections and asbestos related inquiries.

**Authorized Person:** A person authorized by UM and required by work duties to be present in a “regulated area”.

**Bulk Sample:** Means a small portion of a suspect **asbestos** containing building material collected for laboratory analysis to determine the **asbestos** content.

**Class Work:** OSHA categorizes abatement projects into four (4) classes:

**Class I:** The most potentially hazardous class of abatement. The removal of the TSI and sprayed-on or troweled on surfacing material are examples of Class I activities. Most Class I projects are not completed in a single day. Work activities, that involves the removal of boiler, pipe and duct insulation and surfacing material such as spray-on fire proofing. Class I work involves the assistance of an outside contractor, specifically trained and licensed to perform such work.

**Class II:** The removal of other types of ACM other than TSI or surfacing material. Examples of Class II work include floor tile removal and roofing projects. Work activities that involve the removal of other than boiler, pipe and duct insulation or surfacing material such as spray-on fireproofing. Class II work involves the assistance of an outside contractor, specifically trained and licensed to perform such work.

**Class III:** Repair and maintenance operations that are small-scale and short duration. Class III projects were formerly referred to as Operations and Maintenance (O&M) activities. Generally, Class III: Projects are completed in less than one day, can be performed by trained Physical Plant Personnel, or licensed outside contractors. Class III work most often means repair of damaged asbestos utilizing an enclosure or encapsulation (i.e. dip lag).

**Class IV:** Maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II and III activities. Work that involves the maintenance and custodial activities during which employees contact but do not disturb asbestos containing materials or “presumed” asbestos containing materials. It may involve the clean-up of mechanical or storage areas, including dusts, waste and debris in those areas where asbestos is, was or may be present.

**Competent Person:** A person who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective action to eliminate or mitigate the hazard.

**Critical Barrier:** Means one or more layers of plastic sealed over all openings into a work area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a work area from migrating to an adjacent area. Also known as Containment Barrier or Enclosure.

**Decontamination area:** An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

**Demolition:** The wrecking or removal of any load supporting structural member and any related razing, removal or stripping of asbestos containing or presumed asbestos containing materials.

**Disturbance:** Activities that disrupt asbestos or asbestos containing materials or that generate visible debris. It includes but is not limited to; cutting, kicking, striking or otherwise breaking or damaging asbestos or presumed asbestos containing materials.

**Employee exposure:** Exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.

**Fiber:** A particulate form of asbestos, 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

**Friable:** Material that contains more than 1% asbestos that can crumbled, crushed or reduced to powder by hand and finger pressure. Asbestos is most hazardous to health when it is friable and airborne. The most friable material is sprayed on fireproofing that which is normally applied to ceilings and structural metal supports to provide a fire rating, or pipe covering on heat and steam lines that has become damaged.

**Glove-bag:** Not more than a 60x60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which material and tools may be handled.

**HEPA (High Efficiency Particulate Air):** A filter, normally found inside a respirator, HEPA vacuum or other type of filtering system that traps or retains 99.97% of all particles that are 0.3 micrometers or greater in diameter.

**Homogeneous Area:** An area of surfacing material or thermal system insulation that is uniform in color and texture.

**Industrial Hygienist:** A professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards.

**Inspection:** An activity undertaken in a school building, or a public and commercial

building, to determine the presence or location, or to assess the condition of, friable or non-friable asbestos-containing building material (ACM) or suspected ACM, whether by visual or physical examination, or by collecting samples of such material.

**Intact:** ACM that has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

**Negative Exposure Assessment (NEA):** A demonstration by the employer that employee exposure during an operation is expected to be consistently below the PELs.

**Permissible Exposure Limit (PEL):** The maximum allowable exposure to asbestos at 0.1 fibers per cubic centimeter of air as an eight (8) hour time-weighted average.

**Presumed Asbestos Containing Material (PACM):** Suspect materials such as boiler, duct and pipe covering and surfacing material found in buildings that were constructed before 1980 that has not been tested to confirm whether or not it contains asbestos. Until proven by air or bulk sample analysis as being non-asbestos, any material not yet tested is considered to be presumed asbestos containing material.

**Project Designer:** A person who has successfully completed the training requirements for an abatement project designer established by 40 U.S.C. Sec. 763.90(g).

**Regulated Area:** An area established by the employer to demarcate areas where Class I, II, and III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos, exceed or there is a reasonable possibility they may exceed the permissible exposure limit.

**Regulated asbestos-containing material (RACM):** (a) Friable asbestos material, (b) Category I non-friable ACM that has become friable, (c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by 40 CFR 61 Subpart M(NESHAP).

**Removal:** All operations where ACM and/or PACM is taken out or stripped from structures or substrates, and includes demolition operations.

**Renovation:** Altering a facility or one or more facility components in any way, including the stripping or removal of RACM from a facility component. Operations in which load-supporting structural members are wrecked or taken out are demolitions.

**Repair:** Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

**Surfacing Material:** Material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes).

**Surfacing ACM:** Surfacing material which contains 1% asbestos or more.

**Thermal System Insulation (TSI):** ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain contains more than 1% asbestos.

## 5. Program Responsibilities

- A. Asbestos Program Manager (APM): See definition above.
- B. Asbestos Safety Manager: Responsible for annual asbestos hazardous awareness training; review and maintain reports of potential asbestos exposures, and follow up as appropriate.
- C. Managers/Supervisors/Leads:
  - 1. Ensure that employees are aware of the administrative procedures and technical information in this program to prevent and minimize disturbances of asbestos containing materials.
  - 2. Keep track of employees' training/certification for various classifications of asbestos work. Ensure certifications are current. Identify workers needing medical examinations (including time of retirement).
  - 3. Ensure that employees performing regular maintenance and custodial activities conduct and document periodic surveillance of the condition of asbestos containing materials. Ensure that appropriate administrative procedures are in place to cover the specific trades.
  - 4. Assess and document potential asbestos impacts for Facilities Services maintenance and alterations projects. Perform worksite hazard assessments (includes all potential hazards, not just asbestos).
  - 5. Act as the point of contact between shop employees and the APM; initiate consultant work requests and asbestos abatement work requests.
- D. Employees
  - 1. Follow specific work practices found in section \_\_\_\_ "Safe Work Practices for All Employees."
  - 2. Observe their work areas for potential asbestos hazards (also referred to as daily surveillance) and note and report the condition of asbestos-containing materials when performing regular maintenance.
  - 3. Notify their supervisor and/or the APM if suspected ACM or asbestos hazard conditions are encountered.
  - 4. Complete an incident report, as needed.

## **6. Asbestos Abatement**

The University of Montana (University) follows a practice endorsed by the U.S. EPA known as: management (of asbestos) in place. The goal is to maintain existing asbestos containing material (ACM) in a stable condition rather than removal of asbestos for the sake of removing asbestos. The mere presence of asbestos does not constitute a hazard. If the ACM is maintained and undisturbed there is no exposure or risk to a building's occupants. Exposure can occur when the ACM is abated or otherwise disturbed during maintenance operations, remodeling, abuse, or some other activity. Asbestos abatement is a routine occurrence in a facility the magnitude and complexity of UM.

All OSHA abatement categories have specialized training requirements. See Attachment 1 for details.

- Class I or Class II work requires additional training and certification.
- Class III work requires EPA 16 hour O & M training.
- Class IV work requires EPA 16 hour O & M training.

### **A. REQUIREMENTS FOR ASBESTOS ABATEMENT PROJECTS**

All Class I and Class II projects undertaken by the University (or the Montana Department of Architecture and Engineering (State A/E) on behalf of the University) must include an environmental consultant on the design team to survey all construction areas for asbestos-containing material and develop a plan for removal and waste disposal.

Missoula County Asbestos Ordinance – All plans/permits submitted to the Missoula County Building Department or applied for after March 11, 2008 to demolish, repair, alter, renovate, remodel, lift, burn or move any building/structure that falls within the category listed above must include: (1) a letter from an accredited asbestos inspector stating that the asbestos survey is complete, and (2) a second letter signed by the contractor and owner stating that the contractor and owner are aware of the asbestos survey contents. These letters need to be given to the Building Department before a permit/plan will be issued.

The University does not allow asbestos containing materials to be used in new construction/renovation projects. This can be especially challenging if building materials are being obtained from markets outside the United States.

The policy of the University is to engage a licensed abatement contractor for removal of asbestos and other hazardous materials from the work site on any renovation or construction project prior to the general contractor commencing work. The limits of removal will be specified by the project consultant and documented in the contract documents. The general contractor shall not work outside these limits without prior written approval from the owner. If the contractor identifies or suspects any asbestos or other hazardous materials within the limits of construction, he shall immediately stop work and notify the owner. The owner shall engage a licensed contractor to remove the material before proceeding. Any delays caused by the work stoppage shall be added to the completion time of the contract.

The University will include a section addressing asbestos and other known hazardous materials in the construction documents. This section will include a good faith survey of known hazardous

materials in the building. This document is not guaranteed to be all-inclusive. The general contractor is required to protect all of his workers and or subs workers on the project in accordance with all current pertinent requirements. If the general contractor or any of his subs intentionally or unintentionally disturbs hazardous materials in the work site, the contractor is liable for all associated liabilities and claims.

An asbestos inspection of the project worksite must be conducted by an asbestos inspector who is accredited by the State of Montana DEQ. The University must provide a written inspection report to all contractors submitting a bid to undertake any construction, renovation, remodeling, maintenance, repair, or demolition projects before a bid is submitted. Failure to comply with these requirements may subject the University to mandatory fines and construction delays. Don't assume that new buildings, including buildings constructed in the 1990s, are asbestos free.

A copy of the survey must be posted at the project site during construction.

A copy of the inspection report, or executive summary of findings and appropriate portions of the survey, must be included in the contract documents and posted at the project site. It is possible to encounter hidden asbestos containing materials that were not discovered in the good faith survey. If materials suspected of being asbestos-containing are encountered during construction activities, the construction/renovation contractor must immediately stop work and contact the Project Manager or the Construction Coordinator. Work must remain stopped and the suspected material, remain undisturbed until identification and necessary abatement are accomplished. UM building coordinators and or relevant deans, chairs and directors must be notified of all proposed asbestos abatement activities to be conducted within their assigned building(s).

Designated representatives from Facilities Services, Environmental Health and Risk Management, or the asbestos consultant may stop abatement or construction work at any time if unplanned asbestos disturbance is found.

In the event asbestos is disturbed as a result of a contractor's actions, the contractor shall assume full and ultimate responsibility for all associated costs.

## **B. AIR SAMPLING METHODS**

Air sampling is conducted before and during abatement, to monitor workers' exposure, and to ensure that the site has been adequately cleaned (post-abatement, or clearance monitoring). Air sampling will be done by an outside consultant.

Two methods are used to analyze air samples: Phase Contrast Microscopy (PCM) and Transmission Electron Microscopy (TEM):

- a. PCM: The advantages of PCM are the inexpensive cost, the wide-spread availability, the minimal sample preparation, and quick results. PCM is also the OSHA analytical method. The disadvantages are that it is not asbestos specific and fibers smaller than a given size are not counted.

- b. TEM: Unlike PCM, TEM is specific for asbestos and even the smallest of fibers are counted. The disadvantages are the expensive costs and slow turnaround times.

The clearance level for PCM analysis is 0.01 fibers/cubic centimeter of air (f/cc). Levels above this indicate the need for further cleaning or analysis with TEM to confirm the presence of asbestos fibers opposed to non-asbestos fibers present on the sample. Clearance levels for TEM analysis are less than 70 structures per square centimeter of filter area. The current OSHA Permissible Exposure Limit (PEL-TWA) for asbestos is 0.1f/cc for an 8-hour day.

National Institute for Occupant Safety & Health, (NIOSH) has not established an exposure limit for asbestos since NIOSH has not identified thresholds for carcinogens that will protect 100% of the population. NIOSH recommends that occupational exposure to carcinogens, including asbestos fibers, be limited to the lowest feasible concentration.

University maintenance and trades workers who will be working in areas known to contain friable asbestos (nearly all University buildings constructed prior to 1972) shall:

Identify any asbestos that is close to the area of work. If there is any chance of contacting the asbestos as part of the job i.e., hitting it with a pipe, backing into it while changing a valve, or otherwise disturbing it, the individual shall contact the UM Asbestos Inspector prior to starting the work.

The UM Asbestos Inspector will assess the situation and determine if air monitoring is necessary. If so, the work area will be isolated from other occupied space in the room or hallway by a small enclosure. Air monitoring may be done if asbestos is actually disturbed but will not be required if none is contacted in the course of work. Labs, offices or other occupied space will be vacated if a portable enclosure is not erected.

The enclosure is intended to provide a barrier between potentially disturbed asbestos and occupied space. In the event a substantial amount of asbestos is disturbed, the worker shall immediately stop work and inform the UM Asbestos Inspector.

### **C. SPECIAL CONSIDERATIONS IN THE CHARLES H. CLAPP BUILDING (SCIENCE COMPLEX)**

The ceiling tiles may be removed to view what work may need to be done on the 3<sup>rd</sup> & 4<sup>th</sup> floors. An asbestos inspection must still take place before any materials are disturbed by maintenance worker or contractor. Work above the ceiling tile on all other floors must assume that asbestos is present on the ceiling tile and above. Respiratory protection is required for ceiling tile removal on the second floor and below. Contact the UM Asbestos Inspector before moving any tiles in basement, 1<sup>st</sup> floor or 2<sup>nd</sup> floor.

A qualified asbestos worker familiar with the ACM locations in the building will inspect and clean the ceiling tiles and areas above unmarked ceiling areas prior to entry and work by any crafts or trades. All work outside of known clean areas will be accomplished in negative containment with Personal Protective Equipment, (PPE) and respiratory protection or held until the area is abated.

When responding to an emergency in the building take PPE and your High-Efficiency Particulate Air, (HEPA) cartridge fitted respirator with you. “Go Bags” complete with Tyvek suits, your personal respirator and gloves must accompany you when responding. If emergency ceiling access is necessary, close off the room or area to unprotected occupants and wear protective equipment to enter ceiling space. Maintain area or room closure until it has been inspected and cleaned by a qualified asbestos worker. Equipment used in the clean-up will be cleaned or disposed of by the UM Asbestos Inspector.

#### **D. ASBESTOS WORK ORDER DISCRPTION**

All shop supervisors are to asses the possibility of exposure to asbestos when they assign work to a specific employee. If they have further questions they are to contact the UM Asbestos Inspector before assigning work order.

Campus buildings can contain asbestos in several materials:

- Plaster ceiling texture and material overspray
- Transite board on interior or exterior wall and fume hoods
- Lab ovens and incubators and miscellaneous lab equipment
- Pipe insulation and pipe fittings
- Floor tile and mastic
- Vermiculite insulation

Much of this asbestos containing material is painted, covered or by nature is not friable. Care must be taken when working in the building to not cut, drill, scrape or abrade these materials and release asbestos into the air. Contact Facilities Services for inspection and abatement where needed.

Most often asbestos is removed during maintenance activities, or during remodeling projects. The majority of projects at UM are regarded as Class III.

#### **E. ASBESTOS REMOVAL METHOD**

During larger projects or projects of greater complexity (Class I and II), negative pressure enclosures are constructed to prevent the release of any asbestos fibers into the occupied areas of the building. All asbestos abatement projects are clearly labeled to indicate to the campus community that such work is ongoing.

Only wet methods or a HEPA filtered vacuum may be used for asbestos clean-up activities. Respiratory protection is required when working with asbestos. Keeping a material wet ensures that the asbestos does not become airborne. Preventing the material from becoming a dust is the critical exposure control measure.

According to the asbestos ARM 17.74.359 Annual Asbestos Project Permits, section (3), an owner or operator conducting asbestos projects under an annual permit shall comply with all requirements pertaining to asbestos project notification. A Class III, or small scale-short duration maintenance project, is generally defined as being no more than 10 square feet, 3 linear feet, or 3 cubic feet of ACM (e.g., floor tile). Other examples include: amounts that can be removed in a single, small glove bag; removing a gasket on a valve; drilling or cutting a hole into a wall

coated with asbestos; or minor repairs to damaged ACM. More extensive projects are not considered Class III.

ACM waste must be properly disposed. Call the UM Asbestos Inspector for additional information on legal waste disposal procedures and methods.

#### **F. STANDARD HEPA VAC METHOD OR WET METHOD FOR WALL PENETRATIONS**

With the advent of specialized HEPA vacuum technology, the University prefers this method whenever possible instead of the wet method. All employees receive training annually on how to use specialized HEPA vacuum for wall penetrations. Maintenance activities involving minor penetrations of walls in buildings on campus with sheetrock joint compound and skim coats containing asbestos should use either specialized HEPA vacuums or a standardized wet methods to control potential occupational asbestos exposures.

With prior approval from the UM Asbestos Inspector, the wet method may be used. This method is accomplished by using a damp sponge or wet paper towel when making the wall penetration. The damp sponge or wet paper towel should be placed directly on the wall surface at the point of penetration, and the penetration made through both the sponge or paper towel and the wall. The penetration tool (drill bit, screw driver, knife, etc.) should then be withdrawn through the sponge or paper towel while hand pressure is applied to the tool through the sponge or paper towel, thus wiping off possible asbestos contamination following the penetration. Following extraction of the penetration tool the sponge or paper towel should be used to wipe the wall surface of any remaining debris. The sponge or paper towel should then be placed into a small plastic bag and sealed. This work will be done with the help of an asbestos qualified person.

#### **G. FLOODING**

In the event of a flood in the building, the water may wash across or through the ACM and carry asbestos fiber with it to other locations. While the materials are wet there is no danger they will become airborne. The following procedures will be use to insure worker safety.

- a. All clean-up workers will have asbestos awareness training for Class IV cleanup.
- b. Call the work order desk and request an asbestos competent person form Environmental Health & Safety to respond to the site to assess the hazards.
- c. Use disposable gloves and overshoes while cleaning up the water. Clean up water with wet vacs, mops, rags and paper towels as needed. Dispose of mop heads, rags and paper towels and PPE in plastic bags. Seal the bags and leave for asbestos waste disposal. Empty water from wet vac and call the UM Asbestos Inspector for disposal. Do not set up fans until material of concern has been sampled, tested and confirmed not to contain asbestos.
- d. Where materials have splashed and dried or there is heavy contamination, seal off the room to entry by all people. Additional cleanup will be accomplished by asbestos abatement workers.

#### **H. WORK IN TUNNELS**

As of 2008, most asbestos has been removed from the main tunnel system or covered in cement.

All expansion joints should be considered to have asbestos gaskets. When working in the tunnels if any questionable material is found, check with the UM Asbestos Inspector before doing any work.

## **7. Asbestos Sampling and Analysis Protocol Overview**

Asbestos Containing Materials are prevalent in buildings throughout the University of Montana (UM) Missoula campus. Typically, ACM is found in fireproofing, acoustical and decorative ceiling and wall plaster, and thermal pipe and tank insulation. ACM is also found in such materials as plaster walls, ceiling and floor tiles, roof felts, insulation, chemical hoods, oven gaskets, automobile brakes and clutches, and many other items. Because of the significant amount of asbestos (both friable and non-friable) within UM buildings, it is imperative that a coordinated program be in place for identifying ACM, notifying building occupants of its presence and location, and developing procedures to minimize disturbance of asbestos and possible exposure be developed. This section describes the University of Montana Missoula program for identifying and characterizing the condition of asbestos in buildings.

## **8. Campus-wide Surveys**

UM Facilities Services contracted and performed a campus-wide asbestos survey in 1984. A copy of the survey report is located at Facilities Services.

### **SCOPE**

The scope of the survey was as follows:

- a. Locate all suspected friable asbestos containing building materials (ACBM).
- b. Sample all suspected materials and analyze them using Polarized Light Microscopy (PLM).
- c. Characterize the condition of the asbestos based upon a modified EPA algorithm developed by the consultants.
- d. Assign a hazard ranking category and number to each sample location that tested positive for asbestos.
- e. Develop abatement cost estimates for all asbestos locations. Cost estimates included asbestos abatement, development of abatement specifications, project monitoring and restoration. However, restoration costs were not included for all locations that were needed.
- f. Develop guidelines for an asbestos operation and maintenance program.

### **CAMPUS SURVEY AND INSPECTION PROGRAM**

- a. Periodic Surveillance of Friable ACM

In order to prevent exposure of asbestos fibers to building occupants periodic surveillance of known locations of friable ACM will be performed by Facilities Services personnel. Periodic surveillance allows for an evaluation of the condition of the asbestos to determine if deterioration has occurred. If deterioration of the ACM has occurred, report the situation to the UM Asbestos Inspector in Facilities Services.

b. Identification of Non-Friable ACM

The 1984 campus-wide asbestos survey did not sample for the presence of non-friable ACM such as vinyl asbestos floor tiles, roofing felts, packings, gaskets, resilient floor covering – including sheet vinyl goods, mastics, asphalt, roofing products, cement asbestos materials, putties, glazings, adhesives, caulks and other asbestos containing materials that cannot be rendered friable ACM under hand pressure. Presently, building materials are sampled and analyzed prior to the start of construction or maintenance activities.

c. Survey

All work orders are routed through Facilities Services. Supervisors will assess the potential for asbestos hazards. Contact the UM Asbestos Inspector (Montana state accredited inspector) for help in this assessment if necessary. This may involve sampling and analyzing suspected asbestos containing building materials. The proposed work shall not commence until the supervisor has completed the assessment and approved the work order. This survey inspection shall be done by the UM Asbestos Inspector.

d. Bulk Materials Sampling and Analysis

ACM will not be sampled dry. A surfactant and water mixture should always be applied to the sample area first. For core samples a wet sponge technique will be utilized.

The following steps are followed when sampling bulk material:

1. The immediate area is secured so those building occupants are not present. Every attempt will be made to perform sampling after business hours.
2. Wet the surface of the sample area with a surfactant (typically 50% polyethylene glycol) or water. For core sampling, a wet sponge can be placed over the sampled area and the core will be run through the sponge into the suspected ACM.
3. Penetrate the suspected material completely with a sharp object such as a coring tool, blade or knife and remove a small sample of the suspect material.
4. Place the sample in a small glass vial or bag and seal it. Patch or repair the material where the sample was removed. Label the vial and record the following information:
  - UM Sample #
  - Date
  - Location of sample
  - Type of material (e.g. plaster wall, pipe insulation)
  - Name of individual taking sample
  - Laboratory that will be analyzing sample and phone number
  - Sample result (to be filled in after analysis)
5. Submit the sample to an approved laboratory for analysis.
6. Depending upon the quantifying limit needed, the sample should be analyzed by:
  - Polarized Light Microscopy (PLM) for quantifying limits equal to or < 1% asbestos by weight; or
  - Transmission Electron Microscopy (TEM) will be used when required by the Facility Services Director.

e. Quality Assurance (QA)

Appropriate analytical QA procedures must be established and followed by the analytical contractor/industrial hygienist. It is the responsibility of Facilities Services to ensure that appropriate QA requirements are provided to Purchasing and Contracts for inclusion in bid specifications.

## 9. Training and Qualifications

- a. Inspector Training. Any persons engaged in the inspection of a facility for ACM shall have successfully completed a DEQ approved 3-day inspector course of study. Accreditation is required.
- b. Asbestos Maintenance Personnel Training and Qualifications. Any person that is required to work with friable ACM during their normal duties must be properly trained and protected. As a minimum, this training entails:
  - i. Successful completion of a 2 day EPA approved training course for maintenance personnel; and OSHA class III and IV operators;
  - ii. Enrollment in a program of medical surveillance where applicable. The employer shall institute a medical surveillance program for all employees who for a combined total of 30 or more days per year are engaged in Class I, II and III work or are exposed at or above a permissible exposure limit.
  - iii. Being properly fitted and instructed in the use and care of respiratory protection devices and refitting for the respiratory protection device annually or when a significant change in the face to mask fit is detected.
- c. Asbestos Awareness Training. All facilities Services personnel who are likely to encounter ACM in the course of their work shall be given formal yearly asbestos awareness training. The contents of this training are presented in Attachment A.

## 10. Reporting of Incidents

- a. Any incident, accident or emergency resulting in a known exposure of one or more employees must be immediately reported to the UM Asbestos Inspector who will assess the case and determine whether notification of DEQ is required. In making the assessment, the UM Asbestos Inspector will use the following reporting criteria:
  1. The employee(s) is unprotected by an appropriate respirator.
  2. The employee(s) is exposed to asbestos fibers in air at the following time-weighted concentrations:
  3. 8-hour time weighted average concentration of greater than .01 fibers/cc
- b. If required, the UM Asbestos Inspector will report the incident to DEQ within 15 days of the event. The items which shall be addressed in the report include:
  1. The number of employees overexposed.
  2. The circumstances surrounding the over-exposure.
  3. Steps taken to prevent recurrence or avoid future over-exposures.
  4. The results of any environmental analyses done to monitor employee exposure or define the hazard. The type of structure being repaired, constructed or demolished, or the product being manufactured.

5. A copy of each report submitted to Labor and Industry shall be posted in the locations where the incident occurred, and in other locations where it will be conspicuous to other potentially affected employee.

## **11. Waste Management**

All asbestos-containing waste materials are considered special wastes and must be handled and disposed in accordance with State and Federal asbestos regulations. This involves one of the following:

For asbestos abatement contracts, the Project Manager shall ensure that provisions for proper asbestos waste handling, storage, and disposal are included in the contract specifications.

For asbestos waste generated by UM activities (in-house work), the job supervisor shall coordinate with UM Asbestos Inspector for proper removal.

Asbestos waste shipment will be done by a DEQ accredited asbestos worker or contractor/supervisor.

1. Fill out waste shipment record with the following information
  - a. Name address and telephone number of waste generator.
  - b. The administrator (DEQ) Helena, MT 59620-0901.
  - c. The approximate quantity of RACM waste.
  - d. Asbestos project permit number issued by DEQ.
  - e. The name and telephone number of the disposal site operator.
  - f. The name and site location of the disposal site.
  - g. Date transported.
  - h. The name, address and telephone number of transporter.
  - i. A certification that the contents of this shipment are fully and accurately described by proper shipper name and are classified, packed, marked and labeled and are in all respects in proper condition for transport by highway according to applicable international and government regulations.
2. Ensure the asbestos waste is adequately wet.
3. Require all personnel who transport or handles asbestos waste to be qualified in, fit test for and using appropriate respirator and wearing appropriate protective clothing.
4. Load containers containing RACM waste into a dumpster, trailer or transport device lined with 6 mil thick plastic.
5. Ensure transport device is placarded with asbestos danger signs as it is being loaded and unloaded.
6. Retain handling responsibility for asbestos waste until the waste is delivered to and accepted by the operator of a DEQ-approved asbestos waste disposal site and a receipt of the waste shipment record is received and made a part of the project file.

## **12. Emergency Response Assistance**

When emergency assistance is needed regarding an asbestos-related event outside of normal business hours, contact University Police at 243-4000 and request that they in turn contact the following UM personnel:

- Paul Trumbley: Director of Facilities Services
- Chuck Emmett: Director, Environmental Health & Safety
- Jason Sloat, Director of Risk Management & Insurance

### **13. Standard Operating Procedure Small-scale Asbestos Removal**

This Standard Operating Procedure (SOP) provides guidance and requirements for the small-scale removal of ACM. ACM is present in structures in a wide variety of forms and this SOP addresses several types of removal operations as separate items. The requirements of this SOP are in addition to the applicable requirements described in the parent procedure Asbestos Management Plan. Any remediation requiring state permitting, or requiring the removal of suspect materials greater than 10 square or 3 lineal or 3 cubic feet, will be contracted out to a DEQ certified asbestos removal contractor.

#### **GENERAL PROTECTION REQUIREMENTS**

Primary consideration will be given to the protection of building occupants. The following steps shall be taken for any work that may involve disturbing friable ACM:

- Restrict entry to the area for all personnel other than those needed to perform the work.
- Post signs to prevent entry by unauthorized personnel.
- Shut off or temporarily modify the air handling system, and restrict other sources of air movement.
- Use work practices (e.g., glove bag operation as described below) which are designed to inhibit the spread of any fibers released by the work being performed.
- All personnel that are required to work with friable ACM must be properly trained and protected. As a minimum, this protection entails:
  1. Asbestos hazard awareness training
  2. Medical surveillance
  3. Fitting for a respiratory protection device
  4. Refitting for the respiratory protection device each six months or when a significant change in the face to mask fit is detected.

#### **AIR MONITORING**

An outside consultant will monitor for asbestos fiber levels in the breathing zone of the employees and in the ambient air after a regulated project. Prior to an asbestos removal project the consultant will perform ambient air samples at the site of removal, based on the industrial hygienist's discretion.

#### **GLOVE BAG OPERATIONS**

The Glove Bag (OSHA 1926.1101) method provides a safe and easy means for removal of small amounts of ACM on pipes and in small surface areas. The following procedures should be followed when the glove bag method is used to remove ACM.

- Utilize personal protective clothing, such as the Tyvek suits, gloves and respiratory protective mask that has been provided and fitted by Environmental Health and or Risk Management.
- Isolate the area where the ACM is located. Place barrier tape across the doorways and at least 20 feet around the area where the ACM is located, place Visqueen under the glove bag set-up.
- Ensure that all ventilation units that lead to or from the area where the ACM is located are shut off and tagged out.
- Don the respirator and perform a negative and positive pressure test on the device. If you are unable to obtain a successful pressure test on the respirator, see your supervisor.

**DO NOT PROCEED WITH ACM WORK WITHOUT A PROPER RESPIRATOR FIT.**

- Determine the area where the ACM is to be removed. Place the glove bag next to the pipe and measure how much area will need to be removed. Tape the area on the pipe to delineate the area from which ACM will be removed. Tape the bottom seam of the glove bag. Slit the side seams of the glove bag to fit the pipe diameter. Seal the sides and top seam with tape and or staples after placing the necessary tools into the bag. Cut a small hole in the bag in the same area where the wetting wand will be placed during the actual ACM removal stage. Fill the bag with smoke from the smoke pencil and seal the hole. Gently squeeze the bag and observe any leaking areas. Tape the leaking areas to achieve an airtight seal. If the pipe lagging is badly damaged or deteriorated the ACM may require wetting or taping to prevent a further release of fibers.
- Most glove bags will melt or deteriorate at temperatures of 130 F or more. For steam or hot water lines, it may be necessary to shut off the pipe valve to insure that the bag does not deteriorate or that the worker does not receive burns.
- Wet the ACM completely prior to removing and keep the ACM wet during the removal process. Use amended water in an airless spray pump. A hand spray bottle may also be utilized. The hole created for the spray wand can also be used for the HEPA wand.
- All visible suspect ACM must be removed from the pipe using a hard brush and amended water while the glove bag is still in place. Wet wipe and spray the pipe with encapsulate material prior to removing the glove bag. Special attention must be given to exposed ends of pipe lagging.
- Place all tools into one of the armholes and pull inside out. Tape and cut the glove or arm from the glove bag and remove the tools while they are still sealed in the arm or glove.
- Wet the inside of the bag with amended water and place the vacuum wand into the bag and cause the bag to collapse. Seal the bag and remove from the pipe. Place the bag into another 6 mil ASBESTOS DISPOSAL plastic bag and seal this bag. This bag must be marked as an ASBESTOS DISPOSAL BAG.
- The exposed section of pipe will now be closed and sealed with a non-asbestos material.
- If the remaining pipe contains ACM, the pipe must be labeled DANGER ASBESTOS MATERIAL. NON-FRIABLE ACM

## **FLOOR TILES AND OTHER TYPES OF NON-FRIABLE ACM**

Many types of ACM do not meet the criteria for friability, but nevertheless can pose a health hazard if not managed properly.

The type of non-friable ACM most commonly encountered at UM is a flooring material known as vinyl asbestos tile (VAT). Other non-friable forms may include roofing felt, underground water lines, laboratory bench tops, etc.

Although the following requirements relate specifically to VAT, the principles are generally applicable to other removal projects involving non-friable ACM.

Most vinyl asbestos floor tiles on campus are of the 9X 9 tile size. The floor tiles are held in place by an adhesive (mastic) that may also contain asbestos. If there is any doubt whether a specific area of VAT or mastic contains asbestos, call the UM Asbestos Inspector to arrange for positive identification. (Note: Most flooring material in buildings constructed prior to the mid-1970s should be considered as suspect ACM).

Because there is a possibility that during a VAT procedure an employee may become exposed to asbestos fibers in excess of the PEL, the notification procedure for VAT jobs is the same as that prescribed for the glove bag operation above.

All removal of VAT should be performed under wet conditions.

The tiles should be removed with the least amount of breakage of the tiles.

All vacuuming MUST be performed with a HEPA-filtered vacuum machine only.

Mopping may be used to wet-clean debris (which must be assumed to contain asbestos) from the floor. The mop is to be moved in one direction for no more than six feet, turned over, and the action is repeated for six more feet in the same direction. At the end of the two passes the mop is to be rinsed in a water bucket. These actions may be repeated, utilizing the same bucket of water until the water becomes visibly soiled.

Mop heads are to be used for one project only. They are to be disposed of by placing them into an asbestos disposal bag at the end of the project. Asbestos-containing rinse water may also require controlled disposal. Contact the UM Asbestos Inspector for guidance on disposal of all asbestos contaminated wastes.

## **DOCUMENTATION**

The UM Asbestos Inspector will maintain a record of all bulk material and air sampling results performed in support of friable or non-friable asbestos removal projects.

## **ATTACHMENT A: Asbestos Training**

OSHA 1910: applies to all occupational exposures to asbestos in all industries covered by the Occupational Safety and Health Act, except construction and shipbuilding.

General Training Requirements;

- The health effects associated with asbestos exposure
- The relationship between smoking and exposure to asbestos producing lung cancer
- The quantity, location, manner of use, release, and storage of asbestos, and the specific nature of operations which could result in exposure to asbestos
- The engineering controls and work practices associated with the employee's job assignment
- The specific procedures implemented to protect employees from exposure to asbestos, such as appropriate work practices, emergency and clean-up procedures, and personal protective equipment to be used
- The purpose, proper use, and limitations of respirators and protective clothing, if appropriate
- The purpose and a description of the medical surveillance program
- The content of this standard, including appendices
- The names, addresses and phone numbers of public health organizations which provide information, materials, and/or conduct programs concerning smoking cessation
- The requirements for posting signs and affixing labels and the meaning of the required legends for such signs and labels

### **Class IV training requirements (1910) Asbestos Awareness Training**

OSHA's asbestos standard for general industry at 29 CFR 1910.1001(j)(7)(iv) requires employers to provide an asbestos awareness training course for employees who perform housekeeping operations in areas where an asbestos-containing material (ACM) or presumed asbestos-containing material (PACM) is present. Topics covered include:

- health effects of asbestos
- locations of ACM and PACM in the building/facility
- recognition of ACM and PACM damage and deterioration
- requirements in this standard relating to housekeeping, and
- proper response to fiber release episodes
- Standard's requirements related to housekeeping
- This is for all employees who perform housekeeping work in areas where ACM and/or PACM is present. Each such employee shall be so trained at least once a year.

Annual **2 Hour Asbestos Awareness Training** must be provided to Class IV employees under OSHA requirements 1926.1101(K) if cleaning up after Class I, II, or III operations.

### **Class IV training requirements (1926) Asbestos Awareness Training**

Training for employees performing Class IV operations shall be consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(1). Such course shall take at least 2 hours.

- locations of thermal system insulation and surfacing ACM/PACM,
- Information concerning asbestos-containing flooring material, or flooring material where the absence of asbestos has not yet been certified;
- Instruction in recognition of damage, deterioration, and delamination of asbestos containing building materials.

### **Class III O & M Training Requirements**

Initial 16 hour O & M course

29 CFR 1926.1101(k)(9)(ii) requires employers to provide training prior to, or at the time of, an employee's initial assignment, and at least annually thereafter. 20 CFR 1926.1101(k)(9)(v) specifies that the [initial] training for employees performing Class III asbestos work shall take at least 16 hours, including "hands-on" training, and shall be consistent with the Environmental Protection Agency's (EPA's) requirements for asbestos training of school operations and maintenance (O&M) personnel as set forth at [40 CFR 763.92\(a\)\(2\)](#). Commercial training providers of EPA-accredited asbestos training typically conduct refresher courses for O&M asbestos work that is four (4) hours in course length.

OSHA's construction asbestos standard does not specify the minimum length for annual refresher training for employees performing Class III work, but OSHA expects that the annual refresher training would require a minimum of 2 hours and include a "hands-on" component.

U of M does a 1-2 hour asbestos awareness refresher each year along with a 2 hours "hand on" refresher for O & M initially trained employees.

## **ATTACHMENT B: Main Campus Buildings Containing Known Asbestos**

1. Main Hall
2. Math
3. Rankin Hall
4. Natural Science, Natural Science Annex
5. Social Science
6. Forestry, Forestry Green House
7. Schreiber Gym
8. Heating Plant
9. Fine Arts
10. Old Journalism
11. International Center
12. Education Center
13. Music
14. Adams Center
15. Liberal Arts
16. McGill Hall
17. Curry Health Center
18. Art Annex / Pool
19. Health Science
20. Law
21. Physical Plant
22. Clapp Building
23. Lommasson Center
24. University Center
25. Mansfield Library
26. Brantly Hall
27. Elrod Hall
28. Corbin Hall
29. North Corbin Hall
30. Turner Hall
31. Craig Hall
32. Duniway Hall
33. Knowles Hall
34. Jesse Hall
35. Aber Hall
36. 600 University Avenue
37. 1325 Gerald

## **ATTACHMENT C: Buildings Containing Vermiculite Insulation**

1. Facilities Services – in block walls
2. Journalism – in attic
3. Forestry – in attic
4. Natural Science – in attic
5. Math – in attic
6. 1325 Gerald – in attic
7. Dornblaser – shower / change house – in block walls

Any work in these areas that disturb vermiculite report to Facilities Services, The UM Asbestos Inspector before starting.