The University of Montana-Missoula
Asbestos Operations and Maintenance Plan
Revised August 10, 2004
INFORMATION ON ASBESTOS
For specific building information about known asbestos and restricted areas see the Facilities Services web site at: http://www.facs.umt.edu/facilities/

WHAT IS ASBESTOS
Asbestos is a mineral that is mined from the earth. There are several kinds of asbestos. All types of asbestos tend to break into very tiny fibers, many of which are not visible without a microscope. Asbestos is resistant to fire and has high tensile strength.

ARE ANY TYPES OF ASBESTOS SAFE
No. Asbestos-related disease can be caused by all types of asbestos. However, chrysotile appears to require a higher exposure to cause disease than other types of asbestos. Nearly all of the asbestos at the University of Montana-Missoula is chrysotile.

WHERE HAS ASBESTOS BEEN USED
Asbestos has been used in approximately 3,000 different products. The amount of asbestos in asbestos-containing materials varies from less than 1% to 100%. Examples of products that might contain asbestos are:
- Thermal System Insulation (TS1) (e.g., pipe insulation)
- Surfacing material on walls or ceilings
- Textured surfacing material
- Acoustical material
- Transite panels (e.g., garage door panels, fume hood walls, fire walls, etc.)
- Electrical insulation
- Fire proofing material
- Fire-protective clothing
- Fire-rated asbestos core doors
- Fire-stop material and fire-resistant drywall
- Thermal laboratory gloves
- Floor tile (especially 9 inch tile) and tile mastic
- Vinyl sheet flooring
- Personal hair dryers (insulating material)
- Heating pads
- Siding, Roofing Paper, Shingles and Adhesives
- Theatrical lamps (insulation)
- Theatrical (fire) curtains
- Brake pads 1 Clutch disks
- Roofing shingles and adhesives
- Some ceiling tiles
- Some plasters
- Some cements
- Some spackling compounds
- Asbestos cement pipe

Asbestos containing material (ACM) is dangerous if the asbestos fibers can be released. Once they are floating freely in the air, asbestos fibers can be inhaled and cause disease. Some ACM can easily be crumbled by hand pressure. This soft or loosely-bound material is called friable asbestos. Friable ACM is the greatest health concern because it can easily release fibers. Examples of friable asbestos-containing materials are fireproofing on structural beams, sprayed-on asbestos ceiling insulation and troweled-on acoustical insulation. Hard asbestos-containing material, such as vinyl floor tile, in which asbestos fibers are firmly bound or encased, does not generally create exposure problems. However, even non-friable ACM can release fibers and present a hazard if it is sanded, cut, ground or disturbed in some other way. Therefore, any material that contains asbestos has the potential to release fibers and become hazardous.
HOW DO I KNOW IF A PRODUCT CONTAINS ASBESTOS
You cannot tell whether a material contains asbestos by looking at it. The only way to know if a product contains asbestos is to send a piece of the suspect material to a qualified laboratory. This is called a bulk sample. Only certain kinds of microscopes can be used to analyze the sample, polarizing light microscope or an electron microscope. Until you can prove whether or not a product does contain asbestos, be on the safe side and treat it as though it were asbestos.

HOW DOES ASBESTOS ENTER THE BODY
The most common way for asbestos to enter the body is through breathing. Larger fibers usually get trapped in the nose hairs or in the mucous along the breathing passageways. However, some asbestos fibers are so small that they can bypass this body defense mechanism and get deep into the lungs. Asbestos can also enter the digestive tract when you eat or smoke in a contaminated area. Asbestos does not pass through the skin.

WHAT ARE THE HEALTH EFFECTS OF ASBESTOS EXPOSURE
Scientists around the world have demonstrated the links between exposure to asbestos and four serious diseases: lung cancer, mesothelioma, digestive system cancer, and asbestosis.

LUNG CANCER
Asbestos-exposed people are about 5 times more likely to develop lung cancer than non-exposed people. Asbestos and cigarettes are a particularly deadly combination. If a person exposed to asbestos also smokes, his or her chance of getting lung cancer increases dramatically to 50 times that of a non-smoking, non-asbestos exposed person. If you have been exposed to asbestos, the first thing you should do to decrease your risk of getting lung cancer is stop smoking.

MESOTHELIOMA
Mesothelioma is a cancer of the lining of the lungs or of the abdominal cavity. This is a very rare cancer that is almost always associated with asbestos exposure. Mesothelioma has become a major public health concern because this disease can occur after very brief or very low exposures to asbestos. Cases of mesothelioma have occurred in spouses and children of asbestos workers whose only exposures were from the dust brought home on the clothing of family members who worked with asbestos in high exposure settings.

DIGESTIVE SYSTEM CANCERS
Increases in stomach, colon, rectal and other digestive system cancers have been observed in asbestos exposed workers.

ASBESTOSIS
Asbestosis is a scarring of the lung tissue that can lead to shortness of breath. A person with a severe case of asbestosis can barely get enough oxygen to walk. Sometimes the scarring may spread so far through the lungs that it causes death. These severe cases are usually caused by extremely high exposures and are very rarely seen under current working conditions.

WILL I KNOW I’M GETTING SICK FROM ASBESTOS
No. Asbestos does not cause any immediate effects, such as coughing or itching. The diseases caused by asbestos do not appear until 15 to 40 years after your first exposure. This is called the latency period. Even if you feel healthy while you are working with asbestos, you may get sick many years later.

CAN I GET SICK FROM ASBESTOS IF I’M NOT AN ASBESTOS WORKER
Yes. Workers who did not work directly with asbestos, but whose jobs were located near highly contaminated areas, have developed asbestos-related diseases.
IF I'VE ALREADY BEEN EXPOSED, WHY SHOULD I TAKE PRECAUTIONS
The more you are exposed, the more likely you are to develop asbestos-related disease. In addition, the more exposure you have, the sooner you will become sick. You should act to prevent further exposures so that your chances of developing asbestos-related disease will remain small.

IF I’VE BEEN EXPOSED, IS THERE A MEDICAL TEST THAT I SHOULD TAKE
If you are about to begin working with asbestos, or if your job periodically or regularly exposes you to asbestos, you should see a doctor who is knowledgeable about asbestos disease. (Your regular doctor is not likely to know about asbestos-related conditions.) The examination should include, at a minimum: - a work history - a medical history - a chest x-ray - a breathing test. Remember, the signs of asbestos disease usually do not appear for 15 to 40 years after exposure first occurs. However, if you do get sick years later and want to seek compensation, a baseline examination now will document your health status and help doctors relate future changes in your health to your asbestos exposure. Once you are exposed, you should see your doctor regularly. Regular medical exams are important because the chances of curing certain cancers are much greater when detected early.

WHY IS PREVENTION OF ASBESTOS EXPOSURE SO IMPORTANT
Asbestos fibers remain in the lungs. The body cannot break down these fibers. Each exposure adds to the body burden from the previous exposure. Asbestos disease can progress even after you are no longer exposed. Asbestos fibers remain in the lung for life. As long as the fibers stay in your body, you are at risk for developing lung disease. This underscores why you must prevent exposure to asbestos in the first place: you cannot turn back the clock. Asbestos-related diseases are rarely curable. Once these diseases are detected, there is usually little that can be done to change the course of the disease.

ARE THERE LAWS THAT WILL PROTECT ME FROM ASBESTOS
Yes. There are asbestos laws that offer some protection to workers and the general public. For example, OSHA has an Asbestos Standard that outlines proper procedures for asbestos abatement work.

ARE THERE SAFE SUBSTITUTES FOR ASBESTOS
Products like fiberglass and mineral wool are being used as substitutes or replacements for asbestos, but they are not safe substitutes. The few studies that have been done on these products so far indicate that glass fibers and non-asbestos mineral fibers (which are shaped similarly to asbestos fibers) may cause the same kind of lung scarring and cancers as asbestos. Therefore, until we learn more about the health hazards of these substances, you should limit exposure to fiberglass and rock wool by using a fitted respirator with a HEPA filter.

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The University of Montana-Missoula
Asbestos Management Plan

ASBESTOS MANAGEMENT:

UM 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 abraded or otherwise disturbed during maintenance operations, remodeling, abuse, or some other activity.

OSHA categorizes abatement projects into four (4) classes:
Class I: The most potentially hazardous class of abatement. The removal of thermal system insulation (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.
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.
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.
Class IV: Clean-up of ACM waste and debris, or routine cleaning activities involving ACM. Dusting contaminated surfaces, mopping, or other floor care, and cleaning up asbestos-containing materials from thermal system insulation (TSI) are included in Class IV activities.

All abatement categories have specialized training requirements.
Asbestos abatement is a routine occurrence in a facility the magnitude and complexity of UM.

Asbestos-Containing Materials at The University of Montana

Asbestos is a stringently regulated hazardous material. There are at least four aspects that must be considered if asbestos is encountered or suspected in a project: mitigation of environmental contamination; protection of adjacent work-sites and workers; worker safety while handling asbestos and proper waste disposal.

REQUIREMENTS
The design team for The University of Montana and/or the Montana Department of Architecture and Engineering projects must include an environmental consultant to survey all areas impacted by construction for asbestos containing material and develop a plan for removal and waste disposal for all Class 1 and Class 2 projects.

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 of Montana Missoula is to engage a license 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 of Montana – Missoula will include in the construction documents, a section addressing
asbestos and other known hazardous materials. 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.

With limited exceptions, an asbestos good faith inspection of the project work site must be conducted by an AHERA accredited inspector to determine if asbestos containing materials are present. The University must provide a written good faith 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 good faith survey must be posted at the project site during construction.

A copy of the good faith 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. Therefore, the contractor must have at least one individual trained to asbestos supervisor level on site at all times work is in progress. 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.

**Special considerations in the Science Complex**

Until asbestos is fully abated in the Science Complex, monthly air sampling will be done and records kept by Technical Services.

Assume all ceiling tile to have asbestos containing materials (ACM) contamination unless labeled otherwise. Known clean areas and ceiling tiles will be marked with light blue paint on the ceiling grid with boundary arrows on the grid pointing to the cleaned area. Asbestos free thermal surface insulation will be dyed blue or otherwise marked with blue paint.

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 PPE and respiratory protection or held until the area is abated.

**Contact Greg Plantz or Tom Javins for access to unmarked ceiling areas.**

When responding to an emergency in the building take PPE and your 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 Technical Services.
Most often asbestos is removed during maintenance activities, or during remodeling projects. The majority of projects at UM are regarded as Class III. During larger projects or projects of greater complexity, negative pressure enclosures are constructed to prevent the release of any asbestos fibers into the occupied areas of the building. Technical Services or outside contractors performs air monitoring before, during, and after such projects to ensure that air quality criteria established by the EPA, OSHA, and DEQ is maintained. Contractors also monitor their own employees involved in abatement activities.

All projects are conducted to minimize disruption to campus activities. All asbestos abatement projects are clearly labeled to indicate to the campus community that such work is ongoing: Awareness Training is required for Class IV work. Repair and maintenance training is required for Class III work. Additional training and certification is required for Class I or Class II work.

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. State law requires that projects involving more than 50 square feet or 260 linear feet of ACM, require at least a 7 day notification before the start of the abatement. A Class III, or small scale-short duration maintenance project, is generally defined as being no more than 3 linear feet of TSI, or 3 square feet of ACM (e.g., floor tile). Other examples include: amounts that can be removed in a single, small glovebag; 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. On campus, TS handles waste disposal of asbestos. ACM waste includes both building materials, and articles such as thermal gloves and theatre lamps. Call 243-6050 for additional information on legal waste disposal procedures and methods. The rules regarding asbestos can appear complicated and burdensome. With your assistance this work can be done safely and with minimal disruption.

Health Sciences and other ACM containing Building Special Conditions

Asbestos is located in the Health Sciences Building in several materials:
1. Sprayed on cement plaster ceiling texturizer and associated overspray.
2. Transite board on interior walls and the interior of fume hoods.
3. Liners of high temperature ovens and incubators
4. Pipe insulation and cast fitting.
5. Floor tile.

Much of these asbestos containing materials (ACM) 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 Facility Services for inspection and abatement where needed.

In the event of a flood in the building, the water may wash across or though the ACM and carry asbestos fiber with it to other locations. While the materials are wet there is no danger they will become air born. The following procedures will be use to insure worker safety.
1. All clean up workers will have asbestos awareness training for Level 4 cleanup.
2. Call the work order desk and request an asbestos competent person respond to the site to assess the hazards.
3. 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 deliver machine to Technical Services for cleaning.
4. 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.
**Work in Tunnels:** All work in the tunnel system by university personnel or contractors requires use of a properly fitted respirator. Consider all pipe insulation to have asbestos unless otherwise marked. Past practices have likely contaminated dirt and gravel on floors in the tunnels. Areas that may be disturbed during the course of work must be wetted prior to the start of work and kept wet for the duration of the work. PPE must be worn for all but walk through inspections. Contact Technical Services prior to start of any work.

**Loose Fill Insulation**
Loose fill insulation (attics and block fill) may contain vermiculite which will be considered ACM unless proven otherwise by testing and analysis. This material may underlie newer cellulose insulation. Do not make a determination based on the appearance of the top layer of insulation.

**ASBESTOS SAMPLING AND ANALYSIS PROTOCOL OVERVIEW**

Asbestos Containing Materials (ACM) 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.

**SYSTEM-WIDE SURVEYS**
To date, one (1) system-wide asbestos survey has been accomplished for the UM System. Facilities Services contracted and performed the initial survey in 1984. A copy of the survey report is located at the TS office.

**Scope**
The scope of the survey was as follows:
Locate all suspected friable asbestos containing building materials (ACBM).
Sample all suspected materials and analyze them using Polarized Light Microscopy (PLM).
Characterize the condition of the asbestos based upon a modified EPA algorithm developed by the consultants.
Assign a hazard ranking category and number to each sample location that tested positive for asbestos.
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.
Develop guidelines for an asbestos operation and maintenance program.

**CAMPUS SURVEY AND INSPECTION PROGRAM**

**Periodic Surveillance of Friable ACM**
In order to prevent exposure of building occupants to asbestos fibers 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 which increases the potential for exposure of building occupants to asbestos, the following steps will be taken by the Facilities Services resources.
Contact the Technical Services Supervisor in Facilities Services and inform that person of the situation.

**Identification of Non-Friable ACM**
The system-wide asbestos survey did not sample for the presence of non-friable ACM such as plaster walls, vinyl asbestos floor tiles, ceiling tiles, and roofing felts. Because of the potential for employee exposure to
asbestos fiber when these materials are disturbed (e.g. penetrating walls, removing floor and ceiling tiles), a
procedure shall be used to ensure that building materials are sampled and analyzed prior to the start of
construction or maintenance activities.

Survey
All work orders are routed through Facilities Services. Technical Services (TS) will assess the potential for
asbestos hazards. This may involve the sampling and analysis of suspected asbestos containing building
materials. The proposed work shall not commence until Facilities Services has completed the assessment and
approved the work order. The work order is then sent forward with any comments relating to asbestos
control.
AHERA sampling techniques shall be utilized throughout the sampling survey. Only Facilities Services staff
who are trained and certified in this process shall perform asbestos sampling.

Bulk Materials Sampling and Analysis
Asbestos containing material 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:

The immediate area is secured so those building occupants are not present. Every attempt will be
made to perform sampling after business hours.

A respirator with HEPA filters shall be donned prior to taking a sample
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.
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.
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:

- 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

Submit the sample to an approved laboratory for analysis

Depending upon the quantifying limit needed, the sample should be analyzed by either of these two
methods:

- Polarized Light Microscopy (PLM) for quantifying limits equal to or exceeding 0.1% asbestos
  by weight.
- Transmission Electron Microscopy (TEM) if detection limit below 0.1% asbestos by weight is
  needed.

Note: Fine dust samples from operations like brake rebuilding should be analyzed using TEM.

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

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

- PCM: The advantages of PCM are the inexpensive cost (often <$20 per sample), 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.

TEM: Unlike PCM, TEM is specific for asbestos and even the smallest of fibers are counted. The disadvantages are the expensive costs (often $100-300 per sample) 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.

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.

Maintenance and trades workers who will be working in areas known to contain friable asbestos (nearly all UM 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 Technical Services. HEPA respirators and tyvek suits shall be worn in areas like those above the ceilings in the Science Complex.
- TS will assess the situation and if they decide it is necessary, will erect a small enclosure that will isolate the work area from other occupied space in the room or hallway. 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 request TS to assist in decontamination. Other crafts shall defer to recommendations made by TS on safe procedures to follow when incidental contact with asbestos is possible.

Training and Qualifications

Inspector Training. Any person engaged in the inspection of a facility for ACM shall have successfully completed an EPA approved 3-day inspector course of study.

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:

- Successful completion of a 2 day EPA approved training course for maintenance personnel; and OSHA class III and IV operators;
- Enrollment in a program of medical surveillance;
- Being properly fitted and instructed in the use and care of respiratory protection devices and;
- Refitting for the respiratory protection device each six months or when a significant change in the face to mask fit is detected.

Asbestos Awareness Training. All facilities Services personnel who are likely to encounter ACM in the course of their work shall be given formal asbestos awareness training. The contents of this training are presented in Attachment A.

Medical Monitoring
All personnel who are required to work with friable asbestos will receive medical surveillance in accordance with State law.

Reporting of Incidents
1. Any incident, accident or emergency resulting in a known exposure of one or more employees much be immediately reported to Technical Services who will assess the case and determine whether notification of
Labor and Industry is required. In making the assessment, Technical Services will use the reporting criteria summarized as follows:
The employee(s) is unprotected by an appropriate respirator.
The employee(s) is exposed to asbestos fibers in air at the following time-weighted concentrations:
  8-hour time weighted average concentration of greater than 0.1 fibers/cc or
  30 minute time-weighted concentration of greater than 1 fiber/cc.

2. If required, Technical Services will report the incident to the Montana Department of Labor and Industry within 15 days of the event. The items which shall be addressed in the report include:
   The number of employees overexposed.
   The circumstances surrounding the over-exposure.
   Steps taken to prevent recurrence or avoid future over-exposures.
   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.
   A copy of each report submitted to Labor and Industry shall be posted in Technical Services in the locations where the incident occurred, and in other locations where it will be conspicuous to other potentially affected employees.

**WASTE MANAGEMENT**
All asbestos-containing waste materials are considered hazardous wastes and must be handled and disposed in accordance with hazardous waste management procedures. This involves one of the following:
For asbestos abatement contracts, the UM 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 ensure that asbestos-containing wastes are delivered to B.F.I. with pre-notification and correct packing.

**EMERGENCY RESPONSE ASSISTANCE**
When emergency assistance is needed to recover from an asbestos-related event outside of normal business hours, contact University Police at extension 4000 and request that they in turn contact the following UM personnel:
Greg Plantz
Tom Javins
Dan Corti

**UNIVERSITY of MONTANA ASBESTOS MANAGEMENT PROGRAM**

**STANDARD OPERATING PROCEDURE SMALL-SCALE ASBESTOS REMOVAL**

This Standard Operating Procedure (SOP) provides guidance and requirements for the small-scale removal of asbestos-containing materials (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 Program.

**FRIABLE ACM DEFINITION**
Many of the protection requirements for ACM removal depend on whether or not the material is considered friable. The determination of friability is, therefore, a critical step in developing the strategy of ACM removal. If a suspect material is, when dry, capable of being crumbled, pulverized or reduced to a powder by hand pressure, and if the material contains asbestos fibers in excess of 1% it is considered friable ACM and must be treated as a potentially hazardous material.

**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:

- Asbestos hazard awareness training. Medical surveillance.
- Fitting for a respiratory protection device.
- Refitting for the respiratory protection device each six months or when a significant change in the face to mask fit is detected.

AIR MONITORING

Technical Services (TS) or the consultant will monitor for asbestos fiber levels in the breathing zone of the employees and in the ambient air after a removal project. Prior to an asbestos removal project TS or the consultant will perform ambient air samples at the site of removal.

GLOVE BAG OPERATIONS

The Glove Bag 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 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

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.

VINYL ASBESTOS TILE (VAT)

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 Technical Services at 243-6050 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 employees 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 Technical Services for guidance on disposal of all asbestos contaminated wastes.

DOCUMENTATION

Technical Services will maintain a record of all bulk material and air sampling results performed in support of friable or non-friable asbestos removal projects.
OPERATIONS AND MAINTENANCE PROGRAM SUMMARY AND PURPOSE

This section describes the Operations and Maintenance (O&M) Program, which has been established and implemented at the University of Montana Missoula. This 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 UM 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:

- Maintain ACM in good condition.
- Ensure proper cleanup of release of asbestos fibers.
- Prevent further release of fibers.
- Monitor the condition of ACM on campus.

The O&M Program is a major component of the overall UM Asbestos Management Program. 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 Program, such as notification, training, and record keeping.

PROGRAM COMPONENTS

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, reinspection of known ACM as encountered. Technical Services (TS) will sample dust found in areas around ACM, and will also perform supplemental periodic air monitoring based on O&M report, assessed priorities, and in the event of fiber release episodes.

Work Control. Activities that may disturb ACM will be accomplished by TS. 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 estimators or maintenance staff, will be sent to TS for evaluation. TS will perform necessary sampling of suspect ACM.

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.

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.

Basic O&M procedures. General glove bag procedures are described elsewhere. Work practices such as wet wiping, area isolation, HEPA vacuuming and use of personal protective equipment are to be employed whenever feasible.

Special O&M cleaning techniques. Special cleaning practices are required for exposed surfacing or insulation ACM, especially if the ACM is friable. Proper O&M cleaning involves the use of wet cleaning or wet wiping practices to pick up asbestos fibers. The use of vacuum cleaner equipped with a high efficiency particulate air (HEPA) filter is preferable to wet cleaning in some instances, especially where significant amounts of asbestos debris is known to exist. Ordinary vacuum cleaners shall not be used for O&M cleaning. Dry sweeping or dusting can result in suspension of fibers and should not be used.

Response to asbestos fiber release episodes. Releases from incidents involving greater than 3 square or linear feet of ACM are to be managed by isolating the site, erecting barriers, shutting off ventilation systems, notifying TS and other affected personnel, and clean-up under the guidance of TS and the procedures in this document. TS will coordinate clearance air sampling and notifying government agencies, if required. Minor releases (involving less than 3 square or linear feet of ACM) may be handled using wet methods, HEPA vacuums, etc., with notifications and other guidance coordinated by TS.
ATTACHMENT A

UNIVERSITY of MONTANA ASBESTOS MANAGEMENT PROGRAM

ASBESTOS HAZARD AWARENESS TRAINING PURPOSE
The purpose of this procedure is to describe the asbestos awareness-training program. Individuals who are considered Asbestos Competent Persons as defined in the AHERA legislation administer this training.

CONTENTS

PART 1 INTRODUCTION
Introduction of Speakers
Job Title
Education, training, and experience (established credibility)
Purpose of Class
Provide general information regarding asbestos to workers who are considered non-asbestos workers
Address questions students may have on the subject
Overview of Class
Discuss topic areas
Encourage the discussion aspect of the class
Get an idea of the trades represented
Familiarize yourself with your audience
Identify experts for later discussions

PART II HISTORY
Define Asbestos derived from Greek word meaning inextinguishable
Early uses
Spun into cloth similar to cotton
Wicks of lamps
Pottery Finnish potters added to clay to give strength
Re-discovery
Fell out of use in early A.D.
Re-discovered usefulness at the beginning of the industrial revolution
It is estimated that in 7890, 1,000 tons of asbestos was used in the United States. By 1978, 6,000,000 tons were used.
Common uses of Asbestos seen today (Discussion) Write suggestions on the board
Pass out handout of asbestos found in buildings

PART III TYPES OF ASBESTOS AND THEIR USES
Asbestos is any one of six (6) naturally occurring silicates
Mineralogical classifications include:
   Serpentine (e.g. chrysotile)
   Amphibole (e.g. amosite)
Discuss species of asbestos, mineralogic class, common names, characteristic (Refer to handouts and overheads)

PART IV HEALTH EFFECTS OF ASBESTOS
Respiratory Tract
Vast majority of asbestos-related disease is respiratory
Normal function of respiratory system
filtration mechanism for inhaled contaminants review functions
Impaction in nose and mouth
Mucous lined airways
Ciliated cells in airways
Macrophages in alveolar region

Asbestosis characterized by fibrotic scarring of the lung
Reduces lung capacity lungs cannot expand
Latency fifteen to thirty years.
Clear dose/response relationship: the greater the asbestos exposure, the greater the potential for injury
The proposed mechanism for asbestos development is as follows: A few fibers are not filtered out in the upper airways The fibers reach the terminal air sacs (alveoli)
Macrophages in the alveolar region
Asbestos is inert, therefore, it cannot be broken down A coating is subsequently deposited on fiber
Scar tissue forms around the fiber
Increased scarring throughout the lung results in asbestosis

Mesothelioma
A cancer of the pleura
the abdominal cavity lining can also be affected Latency of thirty to forty years
Can be caused by very low exposure: not directly related to dose (Steve McQueen wore an asbestos suit while race car driving. It is thought that this limited exposure may have caused his illness)
Rapidly spreading and always fatal
Lung cancer
Asbestos related tumors are usually found in the lower lobes
Most cancers found are glandular in nature which is rarely the case in non-asbestos related tumors
Latency twenty plus years
Dose/response relationship has been established although no safe level has been determined
Smoking and lung cancer
The risk of developing lung cancer among asbestos workers increases drastically if workers also smoke (use attached overhead) Set the general population equal to 1
Asbestos workers who do not smoke are five times more likely to develop lung cancer than the general public
People who smoke but do not work with asbestos are ten times as likely to develop lung cancer than the general public
People who smoke and work with asbestos are fifty to ninety times as likely to develop cancer
Obviously this incidence rate is due to more than just adding up factors. The term for such relationships where risk factors increase in multiples is synergistic

Mechanism #1
Smoke is inhaled and ciliated cells along the airways are temporarily paralyzed
The body can no longer defend against unwanted dust
The offending asbestos particles cannot be cleared. This allows them more time to work downward toward the alveolar region or imbed into tissues

Mechanism #2
Asbestos is inhaled and trapped in fibrotic areas
Normal mechanical clearance (mucous and cilia) is disrupted
Tobacco smoke subsequently inhaled is cleared less efficiently, therefore, carcinogens in the smoke remain in contact
Asbestos fibers preferentially settle in peripheral regions of lower lobes
Both of the proposed mechanisms result in the same disease; it is likely that a combination of factors elicits the observed synergistic response
Non-respiratory Asbestos-related Conditions

Asbestos warts
Fiber bundles embed in tissue; usually hands Gloves should be worn when handling asbestos Colon, esophageal, or stomach cancer
May be asbestos-related
Fibers can work their way through soft tissues to adjacent structures and embed
Fibers entering the mouth can be swallowed thereby entering the digestive tract
Asbestos physicals generally include a rectal exam
Poor Hygiene, leaving food out in contaminated areas, and carelessness all can contribute to ingestion of asbestos

Symptoms and Effects of Asbestos Exposure
Acute exposure: no immediate symptoms or effects

Chronic Exposure
Shortness of breath  Dry cough
Loss of appetite
Weight loss
Asbestosis
Lung cancer
Mesothelioma
Intestinal tract cancers
By the time chronic effects manifest themselves, disease is most often irreversible

PART VI DISCUSSION OF CONDITIONS OF ASBESTOS
Distribute list of areas known to contain ACM (Notification List) and discuss what causes asbestos materials to become damaged and friable
Some material is applied in a friable state
Fireproofing
Blown on acoustical insulation (Ask for more examples)
Physical disturbance
Basketballs thrown up at asbestos ceilings
Broom handles scraped along corridor ceilings
Ceiling tiles or other debris falling on pipes during renovation
Pipe work requiring breaking seal around lagging
Deterioration or delamination
Water leaks from ceiling causes ceiling asbestos coating to pull away (delamination) from base material
Steam leak
Weather

How to recognize damage
Ceiling water stains
Visibly disturbed lagging
Suspicious debris

PART VII CAMPUS ASBESTOS MANAGEMENT PROGRAM
General program for control of asbestos
Who is the campus asbestos coordinator
What is small-scale (glove bag) removal procedure, and how are Unit 6 personnel involved
Who performs full-scale removal on campus
How are contractors selected
What should be done in the event of an asbestos emergency
What should be done if questionable material not previously classified is discovered

PART VIII REGULATIONS
OSHA Asbestos Regulations (see overhead)
PEL = 0.1 fibers/cc
Action level = 0.1 fibers/cc
29 CFR 1910.1001
Notification of employees
Posting
Asbestos Hazard Emergency Response Act (AHERA)
Regulates K-12 schools only; not private sector or post I2 schools
Outlines protocol for setting up asbestos program requirements, and for training of each party involved in the response effort; specified two-hour awareness training
UM does not fall under these regulations, but rather looks to them for guidance
Large Scale Class 1 and 2 Asbestos Projects

I. Purpose

To set forth procedures pertaining to the use, handling and removal of suspected asbestos containing materials.

II. Background

Most of the asbestos materials for which this organization is concerned with are those used in insulation work. Some may have been in ceiling materials. The health hazard is inhaling the minute fibers. Therefore, once the materials have been installed it is normally not a hazard until it is disturbed and a dust is formed, such as in removal. Protective measures are concerned with avoiding the creation of dust as well as in the use of respirators and other protective equipment in the removal of material. University of Montana Regulations prohibit new installations of asbestos containing materials and establish regulations and procedures for the safe handling of that which has previously been installed when its removal is required.

III. Procedures

Effective immediately, no friable (easily crumbled or dust producing) materials containing asbestos will be used by Facilities Services nor will any be installed by contract.

In all cases of removal or abatement of suspected asbestos materials, the following requirements of this campus policy will be adhered to.

- Only full trained, tested and equipped personnel or contractors will be used in the removal of suspected asbestos materials.
- All removal, repair, or abatement work of friable suspected asbestos materials will be accomplished by the glovebag method or by the full enclosure method described hereafter.
- Material Samples will be taken on each job in accordance with policies described hereafter.
- Air samples will be taken for each job in accordance with policies described hereafter.
- An asbestos log will be maintained by Facilities Services that records all information requested by this policy on all removal or sampling projects.
- All persons involved in the occupation, or assistance of that requires the removal of suspected asbestos material will be provided with medical examinations and training on a yearly basis in accordance with the policies described thereafter.
- All personal protective equipment required for removal of friable asbestos material shall be used in accordance with the policy described hereafter and will be provided by the University for its personnel only.
- All suspected asbestos material or contaminated materials and equipment shall be disposed of in accordance with the policy described hereafter.

IV. Removal and Repair Procedures

As previously described all suspected asbestos removal, repair and abatement shall be accomplished in only one of the methods, either glovebag method or full enclosure method. These are the only techniques that have been approved by the EPA as of this date.

Glovebag Method

Notification: The Department will notify per the asbestos notification requirements which are as follows:
- Department of Environmental Quality- Helena, Montana 10 days in advance for abatement of at least or more than 3 square feet of 3 linear feet.
- By telephone within 24 hours should abatement be an emergency situation followed with a written notification within the same 24 hour period.
**Project Log:** The supervisor in charge shall survey the project and determine the necessary steps to adequately protect the environment, the employees, and the general public from exposure to suspected asbestos containing material.

**Material Sample:** The supervisor in charge shall take a material sample and submit it to an certified asbestos analysis testing laboratory for testing prior to commencement of work.

**Project Review:** Prior to the start of any normally scheduled removal project of suspected asbestos material, the supervisor in charge shall not start the work until the project has been inspected and reviewed to determine if the project can be safely accomplished.

**Air Sampling:** The supervisor in charge will not start a job normally scheduled until all necessary air sampling provisions and instructions to the workmen have been implemented in accordance with Section VI of this policy. The same procedure applies, if possible, under emergency conditions.

**Personal Protection** The supervisor will insure that all workmen involved in the removal project have the adequate protective clothing, respirators and equipment necessary to properly conduct the project in accordance with Section IX of this policy.

**Restriction of Access:** The supervisor in charge shall prior to the start of the project, insure that the Proper warning signs (per OSHA 29 CFR 1910.1001g) are posted and shall restrict the site to all unauthorized personnel for the duration of the project. Also, the supervisor in charge shall make the necessary provisions to minimize air movement out of the area.

**Removal:**
The material to be removed shall he enclosed in an approved glovebag (per Section X of this policy). All seams and contact points with the piping shall be properly sealed with taped joints. All necessary tools and materials needed for the project shall be in the bag prior to enclosing the suspected material, The material to be removed shall be thoroughly wetted with a solution of water and wetting agent. The workers should then carefully remove the material so as not to generate any dust and clean the remaining surfaces and seal the adjoining insulated areas to be exposed when the bag is moved or removed. Upon completion of the project or when the bag is full, the worker shall first evacuate the bag through the side port using an asbestos vacuum cleaner with a HEPA filter then carefully remove the bag and seal the bag opening. Any tools or materials that remain inside the bag which need to be reused and cannot be decontaminated can be removed by isolating them in the gloves, and this equipment and material which is then sealed in the gloves can be removed from the bag and placed in the next glove bag for the rest of the project.

**Disposal of Material Contaminated With Suspected Asbestos:** The supervisor in charge and removal personnel shall take such action as necessary to insure that no suspected asbestos materials or contaminated tools and protective equipment leave the job site except in approved and impervious containers. The suspected asbestos material shall be stored in designated storage areas until arrangements can be made to ultimately dispose of the waste materials in an approved landfill in accordance with Section XI of this policy.

**Project Termination:** The supervisor in charge shall, at the completion of the project, complete the project authorization/loci form with all the required information and shall turn the form over to the Assistant Director of Maintenance (or the designated representative). The original copy shall be filed in the Departmental Asbestos Log. Also, as air sample and material sample results are received, the Assistant Director (or the designated representative) shall update the appropriate project log forms and distribute the necessary copies.

**Notification of the building occupants:** The person in charge shall notify the department chairperson fo the building involved, of the pending asbestos removal project and the implications to its occupants prior to the start of the project.
Full Enclosure Method of Asbestos Removal or Repair

This shall be done in accordance with the Federal Register OSHA appendix F to 1926.58 — Work Practices and Engineering Controls for Major Asbestos Removal, Renovation and Demolition Operations.

Removal of Vinyl Asbestos Floor Tile or Sheet Vinyl Asbestos Flooring

Project Log: The supervisor in charge shall survey the project and determine the necessary steps to adequately protect the environment, the employees, and the general public from exposure to suspected asbestos containing material. The supervisor in charge shall inform the campus Environmental Health and Risk Management Office as part of the notification process described above.

Material Sample: The supervisor in charge shall take a material sample and submit it to a certified asbestos analysis testing laboratory for testing prior to commencement of work.

Project Review: Prior to the start of any normally scheduled removal project of suspected asbestos material, the supervisor in charge shall not start work until the project has been inspected and reviewed to determine if the project can be safely accomplished.

Air Sampling: Abatement personnel must wear air monitors operated in accordance with Section VI.B of this policy. An environmental sample is required.

Personal Protection: All abatement personnel shall wear protective clothing and respirators necessary to properly conduct the project in accordance with Section IX of this policy.

Restriction of Access: The supervisor in charge shall prior to the start of the project, insure that the proper warning signs are posted and shall restrict the site to all unauthorized personnel for the duration of the project.

Removal: The material to be removed shall be enclosed in an approved bag or plastic lined box per Section X of this policy.

Remove of unadhered (loose lay) or peripherally adhered sheet vinyl floor covering:
Remove any binding strips or other restrictive moldings from doorway, walls, etc. Cut a strip the length of the floor about 18" wide along one wall. Remove this strip, gently turn it over and roll face out into tight roll. Secure the roll so it will not unroll and place the roll in to a disposable asbestos container.
Vacuum the exposed floor area with the HEPA vacuum. Do not dry sweep, if sweeping is required, use water or other dust suppressants.
Repeat the above, cutting, removing, rolling, disposing of one strip at a time and clearing the newly exposed area immediately until the whole floor covering has been removed and the whole floor vacuumed clean.
If seams or door openings have been adhered with double faced tape, remove tape and place in a disposable asbestos container.

If any floor covering areas have been adhered with adhesive and remain stuck to the floor, they should be removed by wet scraping per paragraph 9 of this section of this policy.

Removal of Adhered Sheet Vinyl Floor Covering:
Remove any binding strips or other restrictive moldings from doorways, walls, etc. Make a series of parallel cuts four to eight inches apart through the layers parallel to wall. Start at the end of the room farthest from the door entrance and pry up the corner of a strip, separating the backing layer. Pull the layer back upon itself slowly and evenly at the angle that permits the best separation. After it is removed, roll up the strip, face out into a tight roll. Secure the roll so it will not unroll and place the roll into a disposable asbestos container.
Each succeeding strip should be removed in the above manner. Remove the felt remaining on the floor in the stripped area by wet scraping in accordance with paragraph 9 of this section of this policy.

Removal of Floor Tile:
Remove any binding strips or other restrictive moldings from doorway, walls, etc. Start the removal by wetting the work area. Carefully wedge a wall scraper in the seam of two adjoining tiles, gradually forcing the edge of one of the tiles, up and away from the floor, avoid breaking tiles. Keep the work area wet using a mist type sprayer. **Note: safety goggles should be worn.**
When the first tile is removed, place it, without breaking into smaller pieces, in a disposable asbestos container.
Where tiles require additional force for their release, use a hammer to strike the scraper handle with sharp blows of moderate force while maintaining the scraper at a 25 degree to 30 degree angle to the floor. **Wear safety goggles.**
If the above techniques prove inadequate, a hot air gun should be used to heat the tile and adhesive, thereby allowing the scraper to remove the floor tile. Glove and eye protection should be used when handling the hot air gun and heated floor tile and adhesive.
In areas of sub-floor that are cleared of tile, remaining adhesive requiring removal should be scraped using wet scraping techniques in accordance with this policy.
Scrapings and floor tile are to be placed in disposable asbestos containers.

**Wet scraping Method:**
As areas of floor are exposed, thoroughly wet residual felt, adhesive and working area with water or solution of wetting agent and water. Allow time for soaking, with felt. Using stiff bladed scraper, scrape up felt and or adhesive. Re-wet area as it dries out. Place scrapings as they are removed in a disposable asbestos container.
When the whole floor has been cleared of felt and or adhesive, let it dry and vacuum up any dirt using a HEPA vacuum.

V. Material Sampling Method

**Identification of Potentially Friable Asbestos Materials**

**Bulk Asbestos Sample Collection:** A bulk sample may be collected to determine whether the ceiling or other construction material contains any asbestos fibers. Use a small sealable glass, or plastic-capped container, or a sealable plastic sample bag to collect the sample. While wearing an approved respirator and using wet removal techniques, holding the container as far as possible from the face, obtain a full thickness core sample of the sprayed material by penetrating the surface with the container, using a twisting motion. Any surface coating such as paint on a cement material must be penetrated to the substrate. The container is then capped, wet wiped, and sealed with tape, test area encapsulated. Identification should include ID code, building name, address, building tube, sample source, location, date, and name of person who took sample. The sampling procedure should be repeated for every 5,000 square feet (465 square meters) or if appearance of material differs. The sample and container shall be logged and sent to a certified asbestos analysis testing laboratory.

**COLLECT SAMPLES AS FOLLOWS:** Taking a sample of asbestos containing material can damage the material and cause significant release of fibers. The following guidelines are designed to minimize both damage and fiber release.
- **Wear at least a half-face respirator with approved disposable filters.**
- **Clear the area of other people.**
- **Wet the surface of the material to be sampled with water from a spray bottle or place a plastic bag around the sampler.**
- **Collect sample.**
- **With a twisting motion, slowly push the sampler into the material. Be sure to penetrate any**
paint or protective coaling and all the layers of the material. For reusable samplers, extract and eject the sample into a container. Wet-wipe the tube and plunger. For single-use samplers, extract, wet-wipe the exterior, and cap it. Label the container. Clean debris using wet towels and discard them in a plastic bag. Seal all sample areas with encapsulate.

VI. Air Sampling Method

**Full Enclosure Method:** Sampling for airborne asbestos fibers shall be performed before, during, and after asbestos stripping operations. During stripping, samplings in the removal work area, samplings outside containment barriers and outside the building should be of sufficient number and frequency to determine the adequacy of the contamination control. Air sampling is the only valid means for verifying the completeness of the removal process and cleanup. Post-removal sampling during custodial activity is most likely to reveal no residual contamination from settled fibers if the wet removal procedures are followed. Copies of laboratory results or air sampling shall be sent to the Technical Services.

**Glovebag Method Requirements:**
Air sample taken within the breathing zone of each employee as per OSHA, 29CRR 1910.1001. Personal Monitoring - (I) Samples shall be collected from within the breathing zone of the employees on membrane filters of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers. (ii) Sampling frequency and patterns. Samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of employees. At least one environmental sample shall be collected as per OSHA, 29CFR 1910.1001 when contamination of work area is suspected. If removal area has been evacuated, then re-occupancy should not occur until a confirming air sample has been verified.

VIII. Notification Requirements:

**Note:** Section IV-1 addresses notification of building occupants. If an abatement project involves asbestos removal amounting to at least or more than 3 lineal feet of pipe covered by asbestos materials or at least or more than 3 square feet of asbestos material, the Department of Environmental Quality, Cogswell Building, Helena, Montana 59620 must be notified with written notification of the abatement project 10 days in advance.

**Records Requirements:**
**Job Log:** An Asbestos Log and Work Authorization Form must be completed for every job involving asbestos removal.

**Medical Testing and Records Requirements:** Within 20 days of an employees initial exposure to airborne asbestos fibers and at least annually thereafter, The University of Montana will provide a comprehensive medical examination which includes, as a minimum, a chest roentgenogram (posterior - anterior 14 x 17 inches), a history to elicit symptomology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV1).

Any exposure record consisting of personal and environmental monitoring shall be kept for each Employee exposed to airborne asbestos fibers. If the monitored level exceeds 0.05 fibers per cubic centimeter (f/cc) then action will be taken to: 1) Reduce the level of exposure; 2) Provide for medical examinations; and 3) Provide personal protective devices. The actual count where exposures require respiratory protection is 0.1 f/cc, according to the Occupational Safety and Health Administration regulations 29 CFR 1910.1001 and 1923.53 and Environmental Protection Agency regulation 40 CPR Part 763.
Monitoring is performed by placing a cassette in the employee's breathing zone. The cassette holds a filter of 0.3 micron pore size which will trap the asbestos fibers. Air is pulled through the filter at .5 liters per minute operation by a pre-calibrated pump. The pump is worn on the employee's belt. A small hose runs from the pump over to the cassette. The cassette is attached to the collar by a clip. If at any time an employee is found to have been exposed to airborne concentrations of fiber in excess of 0.1 fibers per cubic centimeter of air they shall be notified in writing of the finding and shall be notified of corrective action being taken. The above records will be kept on file for at least 30 years and shall be made available upon request to the EPA and the State of Montana, to authorized physicians, and upon the request of an employee or former employee, to his physician.

Training: All personnel working in or with the University's Asbestos Program shall receive the required training in accordance with Montana state laws.

IX. Personal protective Equipment and Clothing:

The following equipment is provided to the employees of the University for the safe handling and disposal of suspected asbestos materials and shall be used in accordance with procedures established herein.

A. Respirators: Each employee who works with suspected asbestos material shall use a personal form fitted cartridge type of air purifying respirator and shall be medically tested in accordance with policies and procedures described to determine if the employee can function normally with a form fitted respirator. The employee shall then be issued a personal form fitted and tested respirator. The use and maintenance of the respirator will be the responsibility of the employee.

B. Clothing: Disposable clothing will be made available to University personnel in an occupation involved in the removal of suspected asbestos materials. Disposable clothing, and filter cartridges shall be secured at the project site and disposed of in the same manner as suspected asbestos materials.

Bag Method: When a suspected asbestos removal project is accomplished by the previous described method the worker shall wear disposable coveralls, including boots and hood. Also, the employee can wear the coveralls over street clothing because a shower is not required to leave the work site.

Full Enclosure Method: This will be complete containment of the affected area in accordance with the work practices and engineering controls described in the Federal Register OSHA appendix F to 1926.58.

Examples of Disposable Clothing:

Coverall-Disposable Clothing: An asbestos approved breathable one piece type which includes attached hood and boots,

X. Protective Equipment:

The following equipment and supplies shall be made available to the University personnel involved in suspected asbestos removal projects and shall be used in accordance with these policies.

Plastic Sheeting/Bags: All plastic sheeting to cover floors and bags shall be a minimum of 6 mils in thickness. Plastic sheeting to be used to cover walls and equipment or to construct locks shall be 6 mils in thickness.

Pipe Insulation Removal, Bags: Example: An approved glove bag equivalent to 6 mil or thicker.

Air Sampler: Example: Gillian personnel air sampler and its accessories or equivalent with an adjustable pump capable of between .5 - 2.0 liter/min. to 10 liter/min. Also the filter assembly shall have a filter half size of .8 microns.