ASBESTOS AWARENESS

(For Contractors)

December 2013

IMPORTANT

Reviewing this course and completing the quiz alone does not qualify you to work with asbestos (refer to section 7.0). If you have any asbestos concerns within your building please inform your supervisor who will contact the University's Facilities Hazardous Material Coordinator. All work dealing with asbestos must be done by qualified personnel only.

Emergency Contacts

During regular work hours contact the University's Facilities Hazardous Material Coordinator at:
(780) 248-1378

During after-hours emergencies and on weekends contact the University's Maintenance Emergencies at:
(780) 492-4833

For more information regarding asbestos on campus, visit our website at:
http://www.uofaweb.ualberta.ca/pi/hazmat.cfm

TABLE OF CONTENTS

1.0 What Is Asbestos?

Asbestos is a naturally occurring mineral fibre that is resistant to heat and many chemicals. It differs from other minerals because of its' fibrous, crystalline structure that can be separated into flexible fibres.

The name asbestos comes from the Greek word
meaning "unquenchable or indestructible".

Asbestos is found in veins in the host rock and is produced in a commercially useful form by open pit mining and successive stages of crushing and aspiration of the ore. The fibres are then sealed in plastic bags for use in the manufacture of products containing asbestos.

Naturally occurring Chrysotile asbestos in California
Picture from US EPA website:
http://www.epa.gov/region9/toxic/noa/clearcreek/

1.1 Types of Asbestos?

Actinolite Asbestos

There are six major types of asbestos that are divided into two main mineralogical classifications:

Serpentine Asbestos (wavy fibres)
-Chrysotile (makes up ~90% of asbestos used)

-**Amphibole Asbestos (straight fibres)**
-Amosite -Anthophyllite
-Crocidolite -Actinolite
-Tremolite

Tremolite Asbestos

Chrysotile (white) Asbestos

Amosite (brown) Asbestos

Crocidolite (blue) Asbestos

1.2 Uses of Asbestos

The primary use of asbestos has been as an insulator or fire retardant. It is also used as a reinforcing or binding agent in combination with plastics or cement.

The uses for asbestos ranged from products in which the fibres were well bound to friable products in which the fibres could easily become airborne. The construction industry was the main user of asbestos products. It was widely used in over 3,000 products prior to about 1975. Buildings as late as 1985 have been found to have materials containing asbestos. Materials that may contain asbestos include but are not limited to the following:

Walls
Plaster
drywall joint compound
Brick/blockwall mortar
loose vermiculite insulation
cement board (transite)
acoustic and stipple finishes
cement plaster

Ceilings
ceiling tiles
plaster
drywall joint compound
acoustic and stipple finishes
mastics/glues
spray-applied acoustical ins.
cement plaster

Flooring
vinyl/asphalt floor tiles
sheet vinyl flooring
floor levelling compound
mastics/glues
linoleum
tile grout

Building Exterior
window caulking
brick/blockwall mortar
cement board (transite)
plaster
acoustic and stipple finishes
loose wall fill insulation
cement plaster

Mechanical
pipe run insulation
pipe fitting insulation
tank/vessel/boiler insulation
mastics/glues
gaskets or flanges
corrugated “Aircell” insulation
duct expansion joint
cement pipe (transite)
construction paper insulation
cast iron joint packing
felt paper insulation

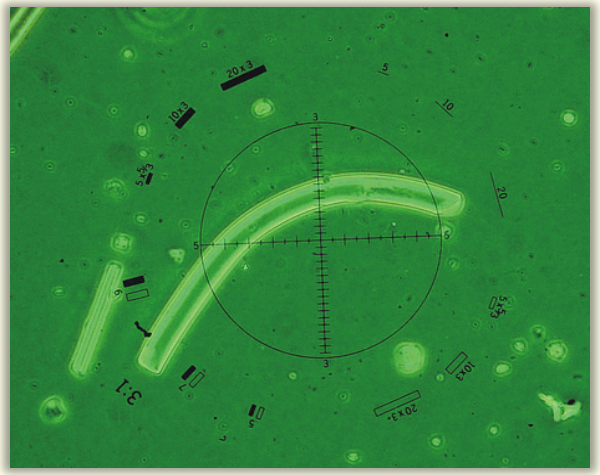
Miscellaneous
incandescent light fixture paper
fume hood lining (transite)
countertop
fireproof curtain/blanket
elevator brake shoes
firestopping
welding blanket or screen
refractory insulation
concrete
highway asphalt
wire insulation
roofing felt, tar or shingles
cement plaster
roofing silver paint
loose attic insulation (vermiculite)
chalkboards
fire door insulation
mastic on sink basins

1.3 Physical Characteristics of Asbestos

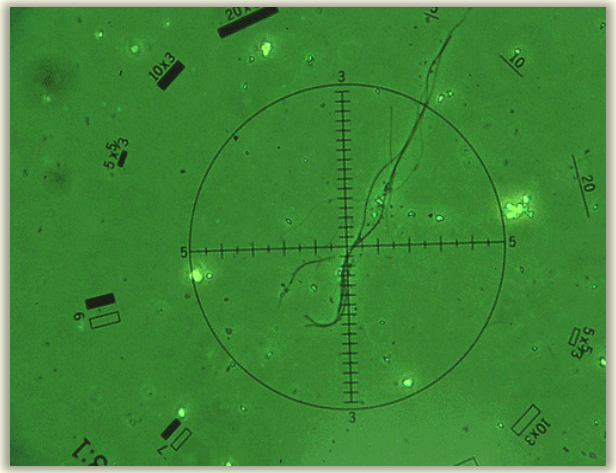
Asbestos fibres, unlike man-made fibres such as fibreglass, can be split into thinner and thinner fibres parallel to their length. The average diameter of an airborne asbestos fibre ranges from 0.11 to 0.24 micrometres.

By comparison, a human hair is approximately 75 micrometres in diameter (more than 300 times thicker) and a glass fibre ranges between 3 to 15 micrometres in diameter.

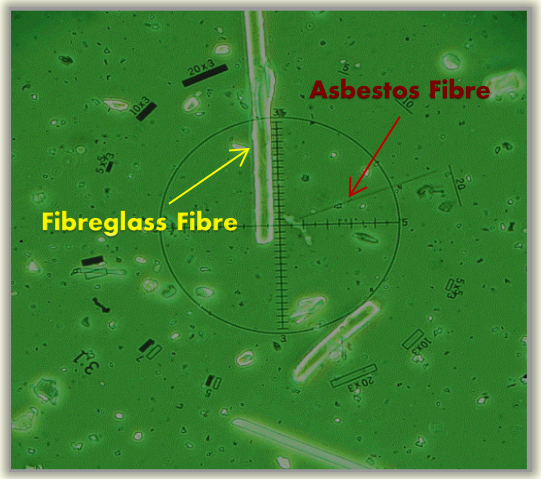
Due to the size of asbestos fibres, if they are disturbed, they tend to settle very slowly in air.



Microscopic view of fibreglass
(400x magnification using Phase-Contrast Microscopy (PCM))



Microscopic view of Chrysotile Asbestos Fibres
(400x magnification using PCM)



Microscopic view of fibreglass fibres next to an Amosite asbestos fibre
(400x magnification using PCM)

2.0 Health Effects of Asbestos

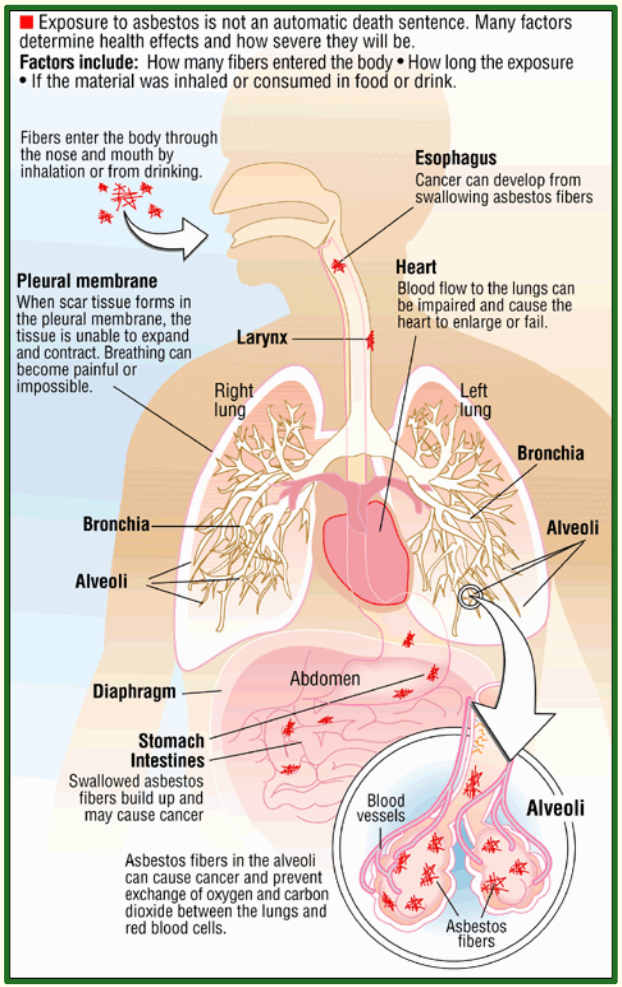
2.1 Entering The Body

The main route of entry for asbestos fibres to enter the body is through inhalation.

Most larger asbestos fibres become trapped in the mucous membranes of the nose and throat where they are then expelled by the body.

Smaller asbestos fibres that pass the body's defence mechanisms, may become embedded into the esophagus, larynx, trachea, lungs, abdomen, stomach, intestines, colon and rectum.

Once embedded into the body's tissue, asbestos fibres may remain for extended periods of time. The fibre's diameter, length and shape determine how far the fibre will penetrate tissue within the body. Amphiboles tend to remain embedded for a very long time due to their more rigid structure.



Picture from Ohio Asbestos Information, http://www.ohiotoxicmold.com/asbestos.htm

2.2 Asbestos Related Diseases

Because of the indestructible nature of asbestos fibres, once they are embedded into tissue, the body cannot break them down or remove them. They remain in place and can cause disease.

There are three primary diseases associated with asbestos exposure:
•Asbestosis
•Mesothelioma
•Lung Cancer (asbestos-induced)

Other notifiable diseases associated with asbestos exposure include:
- Asbestos-induced Laryngeal Cancer
- Asbestos-induced Gastrointestinal Cancer

Asbestosis
Associated with exposure to high concentrations of airborne asbestos fibres over a prolonged period of time. The body tries to build up scar tissue around the embedded fibres in the lungs in an attempt to remove them. This causes the lung tissues to stiffen and leads to symptoms of coughing, difficulty breathing and weight loss.

There is no effective treatment for asbestosis. The disease is usually disabling and can be fatal. Asbestosis usually develops 10 to 20 years after initial exposure.

The risk of asbestosis is minimal for those who do not work directly with asbestos.

Mesothelioma
A rare type of cancer that affects the pleura, the membranes that line the lungs, and of the peritoneum, a membrane which lines the abdomen. Evidence suggests that this type of cancer is caused only by exposure to asbestos fibres.

Unlike asbestosis, the development of mesothelioma is not related to the amount of asbestos inhaled. Research has shown that the disease has developed in individuals exposed to asbestos for as little as two months and for as long as 50 years.

The onset of this disease may occur after 15 to 55 years (average of 40 years) for both long term and short term exposure.

Lung Cancer
Asbestos exposed workers are at an increased risk of developing lung cancer. Lung cancer causes the largest number of deaths related to asbestos exposure.

Smoking has a synergistic effect with asbestos exposure. Studies have shown that asbestos workers who smoke are approximately 90 times more likely to develop lung cancer than people who don't smoke or have been exposed to asbestos.

Lung cancer can appear after approximately 15 to 25 years, depending on the frequency and duration of exposure. Exposure to asbestos fibres for 4 to 6 months may be sufficient to cause lung cancer.

3.0 Recognizing Asbestos Materials on Campus

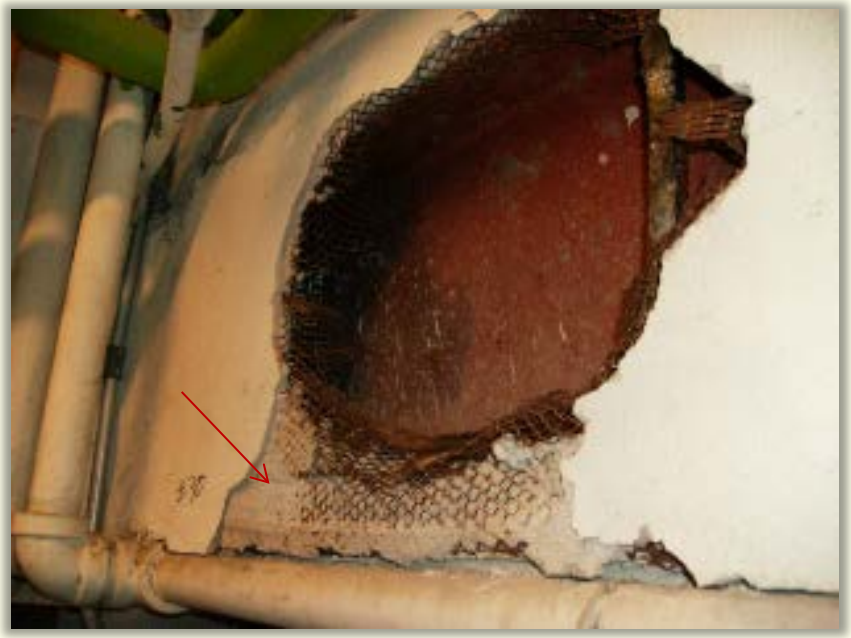
Asbestos can be found in a wide variety of products. The following are some examples of asbestos containing materials that have been identified on campus. **Note: The following materials do not pose a health risk if there are intact and undisturbed.**

Wall Materials

Drywall joint compound – Law Centre

Drywall joint compound – General Services Building

Wall Materials, continued



Plaster (rough coat) – Chemistry Centre West

Decorative cement plaster – Humanities Centre

Wall Materials, continued

Trowelled Plaster – HUB Mall

Mastic/cork mixture on a block wall – Chemistry Centre West

Wall Materials, continued

Cement board (transite) – Agriculture/Forestry Centre

Ceiling Materials

2’x4’ T-bar ceiling tile – Medical Sciences Building

2’x2’ T-bar ceiling tile – Pavillon McMahon (Campus Saint-Jean)

Ceiling Materials, continued

Ceiling tile mastic – Biological Sciences Building

Spray-applied acoustical textured finish above T-bar ceiling tiles – Dentistry Pharmacy Centre

Ceiling Materials, continued

Decorative textured finish – Education Centre North

Decorative stippled finish – Education Centre North

Ceiling Materials, continued

Decorative stipple coat – Mechanical Engineering Building

Spray-applied fireproofing – Chemistry Centre East

Flooring Materials

9”x9” vinyl floor tiles – Dentistry Pharmacy Centre

9”x9” and 12”x12” vinyl floor tiles – Chemistry Centre West

Flooring Materials, continued

9”x9” vinyl floor tiles – Administration Building

12”x12” Vinyl floor tiles – Law Centre

Flooring Materials, continued

Sheet vinyl flooring – Dentistry Pharmacy Centre

Sheet Vinyl Flooring – Chemistry Centre - East

Flooring Materials, continued

Floor Tile Mastic – General Services Building

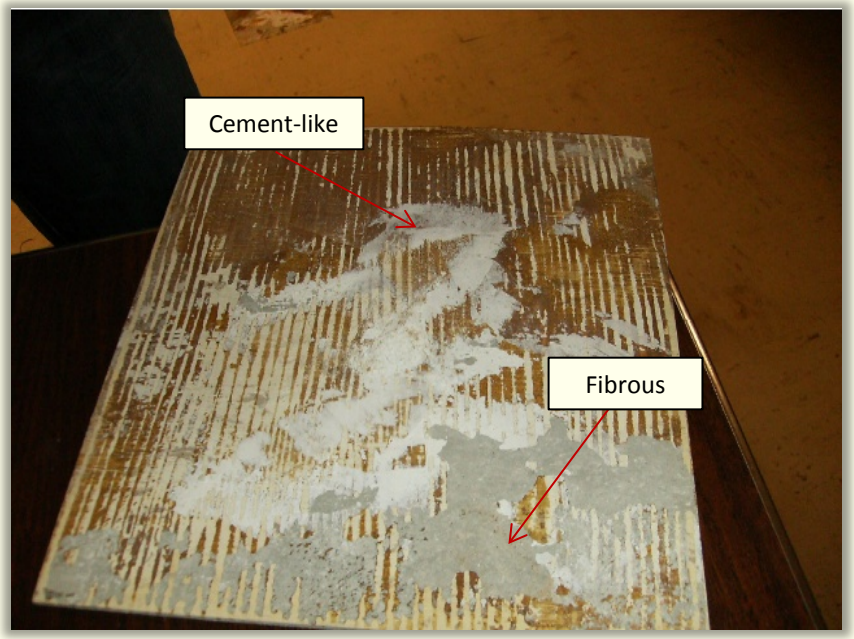
Cement-like floor levelling compound – Education Centre North

Flooring Materials, continued

Fibrous floor levelling compound – Medical Sciences Building

Cement-like floor levelling compound – Dentistry Pharmacy Centre

Flooring Materials, continued



Fibrous and cement-like floor levelling compound – H.M. Tory Building

Mechanical Materials

Block pipe run insulation – H.M. Tory Building

Corrugated “Aircell” pipe run insulation – Dentistry Pharmacy Centre

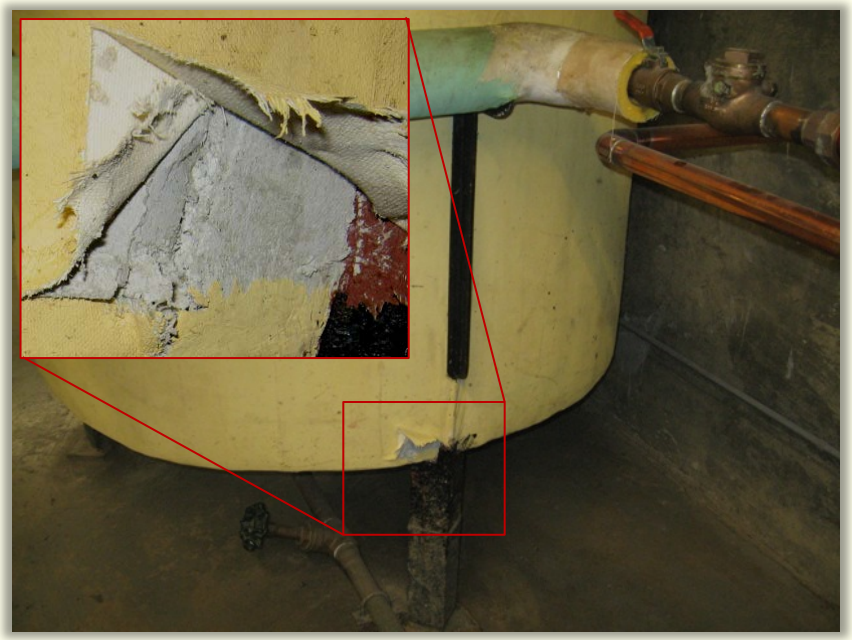
Mechanical Materials, continued

Pipe fitting insulation – H.M. Tory Building

Pipe fitting insulation – Chemistry Centre East

Mechanical Materials, continued

Parging cement on ductwork – Van Vliet East



Parging cement on a hot water tank – H.M. Tory Building

Mechanical Materials, continued

Gasket – H.M. Tory Building

Gasket– Mechanical Engineering Building

Mechanical Materials, continued

Joint packing on a cast iron pipe – Chemistry Centre West

Construction paper pipe insulation – University Hall

Mechanical Materials, continued

Mastic on ductwork – North Power Plant

Mastic on ductwork – Chemistry Centre West

Mechanical Materials, continued

Mastic on ductwork – Chemistry Centre - East

Mastic on fibreglass sheets inside Air Handling Unit – Athabasca Hall

Mechanical Materials, continued

Cement (transite) fume hood exhaust duct – Chemistry Centre West

Cement (transite) fume hood exhaust duct – Chemistry Centre West

Building Exterior Materials

Roofing core sample (asbestos felt) – Triffo Hall (abated)

Felt on roof exhaust duct – Triffo Hall (abated)

Building Exterior Materials, continued

Trowelled Plaster – HUB Mall

Miscellaneous Materials

Countertop – Chemistry Centre West

Countertop – Dentistry Pharmacy Centre

Miscellaneous Materials

Countertop – Biological Sciences Building

Countertop – Chemistry Centre - East

Miscellaneous Materials, continued

Paper insulation on incandescent light fixture – Pavillon McMahon (Campus Saint-Jean) (abated)

Heat resistant gloves – Chemistry Centre West

Miscellaneous Materials, continued

Loose brown vermiculite from block wall cavity – Chemistry Centre East

Loose black vermiculite from block wall cavity – RCMS Building

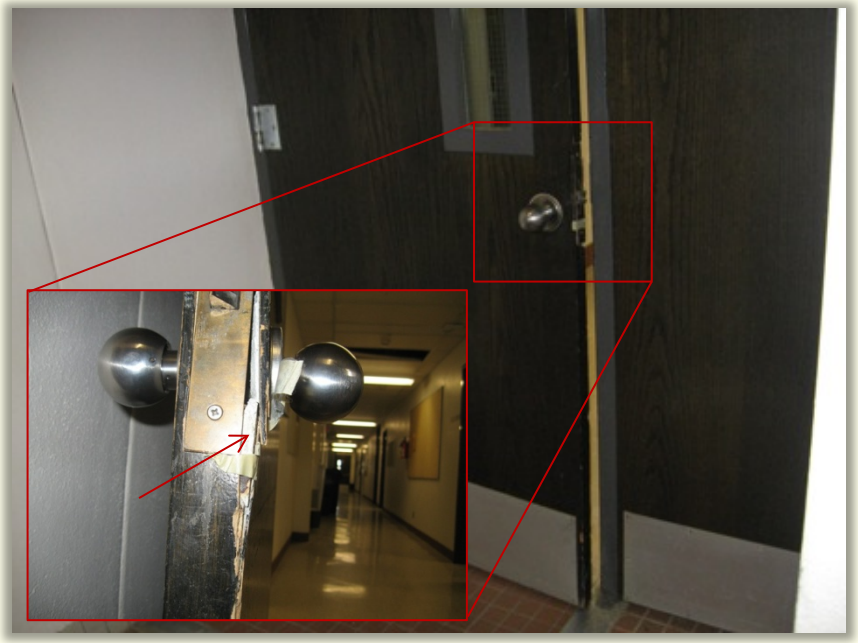
Miscellaneous Materials, continued

Cement board (transite) inside a fume hood – H.M. Tory Building

Cement board (transite) inside an acid cabinet – Chemistry Centre - East

Miscellaneous Materials, continued

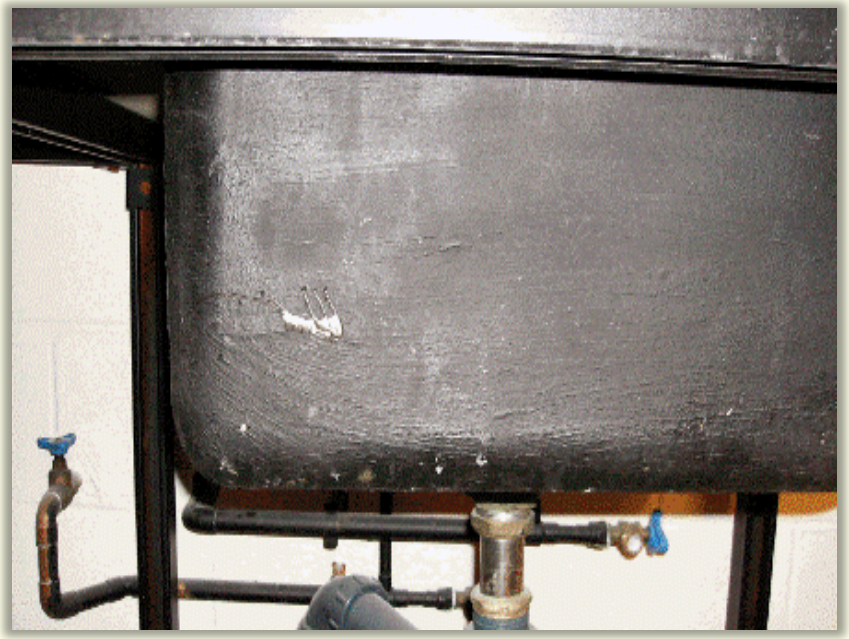
Cement board (transite) countertop – Education Centre - South



Fire door – Biological Sciences Building

Miscellaneous Materials, continued

Mastic on sink basin – Mechanical Engineering Building



Mastic on sink basin – Agriculture/Forestry Centre

Miscellaneous Materials, continued

Ceiling texture overspray on duct and concrete structure – Education Centre - North

Joint packing around transite duct joint – Chemistry Centre - West

4.0 Asbestos Exposure Assessment

4.1 When is Asbestos a Hazard?

Asbestos fibres must be inhaled to cause adverse health effects. **Intact and undisturbed asbestos containing materials present no direct risk of exposure**. It is only when the materials are damaged or are in a friable (easily crumbed) form that fibres may become airborne and become a potential exposure risk.

Asbestos containing materials such as ceiling tiles, drywall joint compound, floor tiles, laboratory countertops, fire doors, canvas-wrapped mechanical insulation, etc. **will not release asbestos fibres** unless they are disturbed or damaged in some way (braking, cutting, grinding, drilling, sawing, striking, etc.).

The asbestos fibres are bound into the matrix of the material, with the majority of building materials that contain asbestos. In order for asbestos fibres in materials such as floor tiles and laboratory counter tops to become airborne and become a potential health hazard, the materials must be in poor condition at a level to which dust is created.

Evidence suggests that people who become ill from asbestos are almost always those who have been exposed to airborne asbestos fibres in a job where they work directly with asbestos.

When assessing asbestos exposure potential, three major factors must be considered:

1) Accessibility *(can the material be easily reached?)*

2) Condition *(is the material damaged?)*

3) Friability *(can the material be easily crushed by hand?)*
   - Asbestos containing spray-applied acoustical insulation is friable
   - Asbestos containing floor tile is non-friable

Other factors that may contribute to the release of asbestos fibres include:

- Water damage;

- Exposed surface area of friable materials (exposed friable materials = higher potential for fibre fallout);

- Activity and movement adjacent to friable materials (i.e. air movement, vibration, high traffic locations (ex. hallways));

- Air plenum or direct air stream (return or supply air plenums);

- Asbestos content (higher asbestos content percentage = higher potential for fibre release)

4.2 How to Prevent Asbestos Exposure

In order to avoid being exposed to asbestos, you must first have a general knowledge of what materials contain asbestos and be aware of typical areas where these materials may be located on campus. Generally, buildings on campus constructed after 1985 do not contain asbestos (ex. Timms Centre –> 1995; NREF –> 2005).

If you do not know whether a building material contains asbestos or not and it fits the suspect material category, **it must be treated as asbestos** until it is proven otherwise. Keep in mind that most asbestos containing materials cannot be identified by simply looking at them. Typically, bulk sampling and analysis is required to determine the presence and content of asbestos.

Never try to collect a sample yourself! If you have a concern about asbestos in your building, notify your supervisor who can then contact the University's Facilities Hazardous Materials Coordinator (FHMC). The FHMC will conduct a thorough assessment and/or collect any suspect asbestos containing material(s) for analysis.

Never impact (drill , hammer, cut, saw, break, damage, move, etc.) any suspect asbestos containing materials.
Activities that may impact asbestos and potentially release asbestos fibres include:

- drilling into block walls, plaster, drywall, decorative textured finishes to install conduit, pipe hangers, shelving, etc.;
- scrapping spray applied acoustical insulation to install conduit, pipe hangers, shelving, etc.;
- drilling into drywall, plaster and decorative textured finishes to hang pictures, signs, etc.;
- drilling into fume hood linings (containing transite board) to install shelving, tubing, etc.;
- removing ceiling tiles (*asbestos debris may be on top of the ceiling tiles*);
- drilling /cutting floor tiles, sheet vinyl flooring and linoleum to install conduit, piping, etc.;
- drilling /cutting lab countertops;
- drilling into or sawing cement (transite) pipe or fume hood exhaust ducts
- drilling or cutting roofing felt/shingles;
- drilling into or removing hardware from fire doors;
- cutting into any type of mechanical insulation (i.e. Insulation on piping, ductwork, boilers, hot water tanks, etc.)

4.3 Damaged Asbestos Materials and Accidental Disturbance of Asbestos

If you discover suspected asbestos containing materials in poor condition or debris you should:

1) Immediately vacate the area
2) Ensure access to the area is restricted
3) Report your discovery to your supervisor who will notify the FHMC

If you accidentally disturb suspected asbestos containing materials you should:

1) Immediately stop work
2) Isolate the work area
3) Report the incident to your supervisor who will notify the FHMC
4) Complete a Near Miss/Incident report form

The University's Facilities Hazardous Material Coordinator in conjunction with the Department of Environment, Health and Safety will conduct an investigation to identify the following concerns:

1) Is the material actually asbestos containing? (bulk sampling and analysis may be required)
2) If so, what are the appropriate clean-up or abatement procedures?
3) What measures can be taken to prevent any recurrences?

5.0 Asbestos Management Program

The University is actively involved in a comprehensive Asbestos Management Program (AMP) to safely manage and remove asbestos containing materials.

The AMP includes:

• conducting periodic audits of asbestos containing materials throughout the campus to review the condition of the materials and determining appropriate abatement procedures if necessary;

• maintaining a web-based graphical database that outlines the majority of asbestos containing materials present within campus buildings. The database illustrates the asbestos materials on a room-by-room basis within a given building by using color-coded floor plans indicating the presence or absence of asbestos.

• placing signage within mechanical rooms to indicate the presence of asbestos containing materials. This signage is used by University Trades personnel and outside contractors during maintenance and renovation activities.

• hiring qualified asbestos abatement contractors to remove asbestos containing materials during routine maintenance activities or during small and large-scale renovation projects. All abatement projects are monitored by specialized external environmental consultants hired by the University.

• Compiling an active prioritized list of areas with asbestos containing materials identified in poor to moderate condition that require abatement. These areas are then addressed on an annual basis as part of a campus wide abatement program through Facilities and Operations.

5.1 Asbestos Abatement on Campus

All asbestos abatement work on campus is conducted by qualified outside asbestos abatement contractors, approved by Alberta Workplace Health and Safety, hired by the University. Specialized environmental consultants are also hired by the University to ensure the work is being carried out in accordance with provincial regulations. The consultant ensures that the safest work procedures are followed, minimizing fibre release during the project. They also conduct continuous air monitoring inside and outside the abatement work area during all phases of the work to ensure that airborne fibres concentrations are safe to the abatement workers and the building occupants. All air monitoring results and an outline of the consultant's activities are detailed in a report and submitted to the University on a daily basis for every project.

Asbestos abatement may be required for the following reasons:

- Asbestos materials are scheduled to be impacted or disturbed during maintenance activities;
- Asbestos materials are scheduled to be impacted or disturbed during small and large-scale renovation projects;
- Asbestos materials are accidentally damaged by maintenance activities, renovations, flooding, etc.;
- Asbestos materials are observed to be in poor condition and may pose a potential exposure risk.

Asbestos abatement projects are classified as either Low, Moderate or High-risk depending on the type of asbestos application, the location and the amount of material being impacted. The abatement contractor uses specialized procedures outlined in the *Alberta Asbestos Abatement Manual*, established by the *Alberta Government, Employment and Immigration*.

The abatement contractor must submit a Notification of Project (NOP) to *Alberta Workplace Health and Safety* for every abatement project 72 hours before scheduling abatement and cannot commence work until the Government returns a Notification of Project Acknowledgement (NOPA) to them (exceptions may be made for emergency clean-ups).

The area that is being abated is completely isolated from the rest of the building. This may involve physically blocking the ventilation ducts and constructing a containment – a framed structure around the entire abatement work area consisting of wood and heavy duty polyethylene sheeting approved for abatement purposes.

Various “asbestos control systems” are also put in place to protect building occupants during abatement activities. These “control systems” include:

• installation of 3-stage negative air units (with high efficiency particulate air (HEPA) filters) inside the containment that exhaust filtered air to the outside of the building. These units create a continuous negative pressure inside the containment which prevents any asbestos fibres from migrating outside the containment;

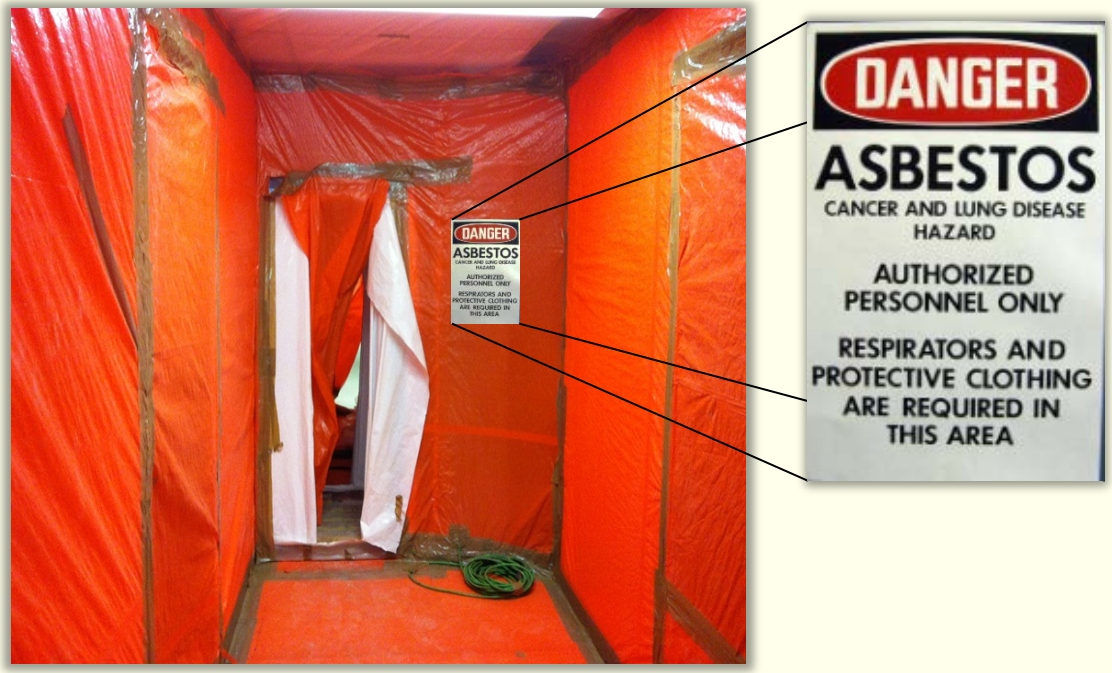
• using powered airless sprayers inside the containment that thoroughly soak the asbestos material(s) with amended water (water mixed with a surfactant), minimizing the release of airborne asbestos fibres within the containment. The airless sprayer is also used to glue-spray all surfaces inside the containment once abatement activities are complete to ensure that no airborne fibres remain within the area;

• the installation of a decontamination facility at the entrance to the containment equipped with a shower used to decontaminate the abatement workers before they exit the containment, preventing contamination into the remainder of the building. The decontamination facility typically consists of three connected rooms (“clean room”, “shower room”, and dirty room”) separated by airlocks.

• 6 mil Asbestos waste bags are used to store asbestos waste during abatement and transport the waste to an approved landfill. The waste is placed in a bag and its opening sealed with duct tape; the bag is then transferred through the decontamination unit where it is decontaminated - at which point it is placed in a secondary bag and sealed again with duct tape. The double bagged waste is then temporarily stored in area outside the containment (or in a designated asbestos waste bin) until picked up for disposal.

5.2 Asbestos Containments and Control Systems

Asbestos Containments:



Typical entrance into an asbestos abatement containment (photo taken inside “Clean Room”)

Inside a high-risk containment for the abatement of asbestos containing floor tile and floor levelling compound

Asbestos Containments, continued:

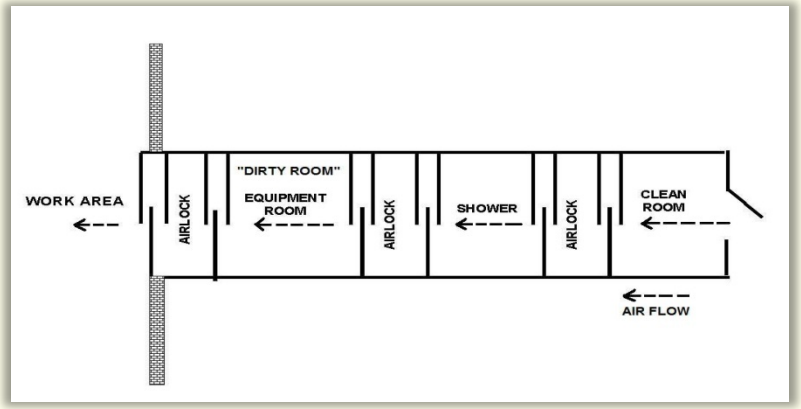
Inside a high-risk containment for the abatement of asbestos contaminated vermiculite from a block wall

Glovebags used to perform localized abatement of asbestos containing pipe fitting insulation

Asbestos waste bags used to store and transfer asbestos waste

Asbestos Control Systems:

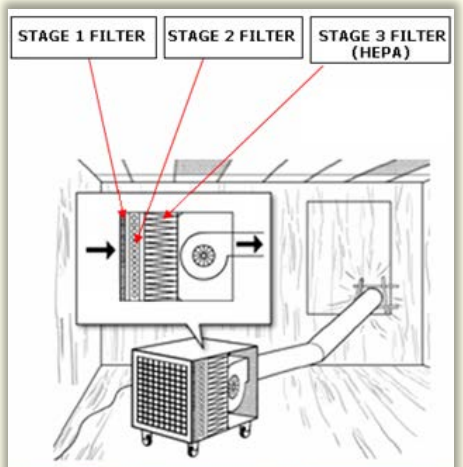
Shower used in 3-stage decontamination facility



3-stage decontamination facility

HEPA-filtered vacuum

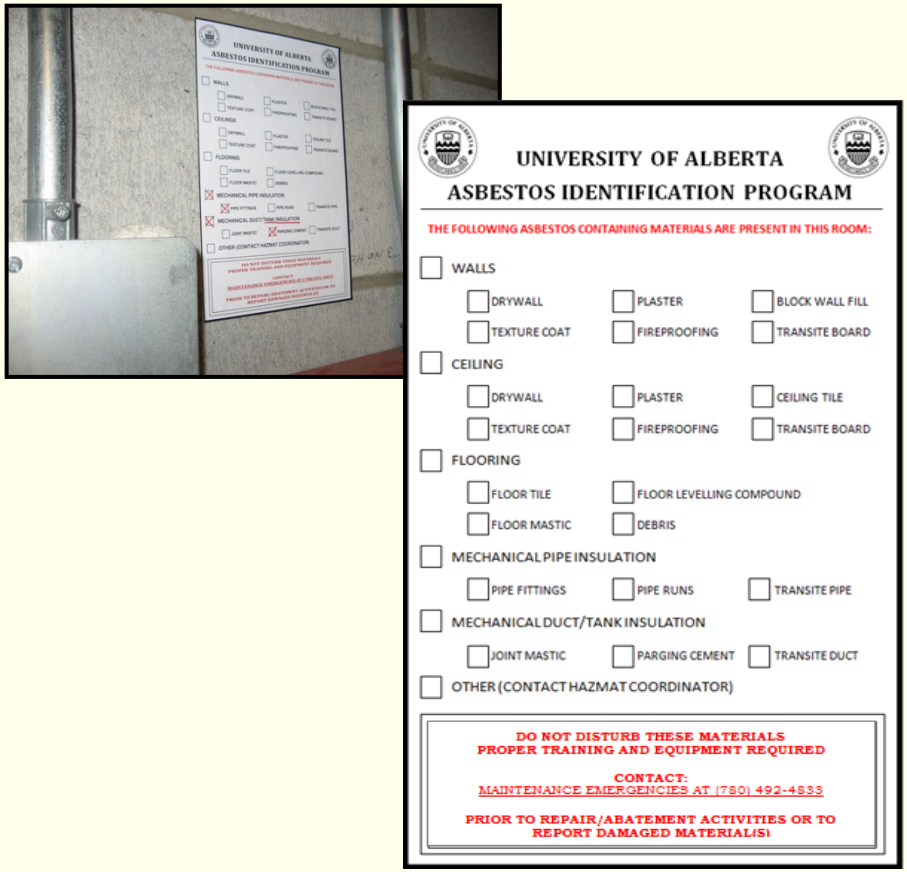
Airless sprayer



3-Stage Negative Air Unit (NAU)

5.3 Asbestos Signage in Mechanical Rooms

Label posted on door to mechanical room containing asbestos materials



Label posted inside a mechanical room (on wall by main entrance) containing asbestos materials. It identifies the types of asbestos materials found within the room

5.3 Asbestos Signage in Mechanical Rooms

Labels applied to asbestos containing pipe and duct insulation

Labels and stencils indicating transition from asbestos to non-asbestos insulation

6.0 Asbestos Regulations and Guidelines

The *Occupational Health and Safety (OHS) Act* is the Alberta law intended to protect the health and safety of workers on the job. *Human Services* is the Alberta government department responsible for administering the *Act*.

Part 4 of the *OHS Code, Chemical Hazards, Biological Hazards and Harmful Substances*, sets limits for exposure to chemicals, including asbestos. *Schedule 1, Table 2 of the OHS Code, Occupational exposure limits for chemical substances* indicates that the 8-hour Occupational Exposure Limit (OEL) is **0.1 f/cc** (fibres per cubic centimetre of air) for all forms of asbestos. Generally, one-tenth of the 8-hour OEL is used as a guideline for acceptable non-occupational exposure to asbestos.

Alberta Human Services has developed guidelines known as the *Alberta Asbestos Abatement Manual* that outlines all important information and procedures relating to asbestos, including the health effects of asbestos exposure, associated legislation, asbestos abatement procedures, asbestos air monitoring, etc.

All external asbestos abatement contractors and consultants hired by the University area required to follow the *Alberta Asbestos Abatement Manual* when removing hazardous materials on campus.

6.1 Specific Legislative Requirements

The following provincial legislation is of specific importance when dealing with asbestos:

*Occupational Health and Safety **Act**:*

"Section 2: Obligations of employers, workers, etc.

(1) Every employer shall ensure, as far as it is reasonably practicable for the employer to do so,

(a) the health and safety of

(i) workers engaged in the work of that employer, and

(ii) those workers not engaged in the work of that employer but present at the work site at which that work is being carried out, and

(b) that the workers engaged in the work of that employer are aware of their responsibilities and duties under this Act, the regulations and the adopted code.

(2) Every worker shall, while engaged in an occupation,

(a) take reasonable care to protect the health and safety of the worker and of other workers present while the worker is working, and

(b) co-operate with the worker's employer for the purposes of protecting the health and safety of

(i) the worker,

(ii) other workers engaged in the work of the employer, and

(iii) other workers not engaged in the work of that employer but present at the work site at which that work is being carried out.

(3) Every supplier shall ensure, as far as it is reasonably practicable for the supplier to do so, that any tool, appliance or equipment that the supplier supplies is in safe operating condition.

(4) Every supplier shall ensure that any tool, appliance, equipment, designated substance or hazardous material that the supplier supplies complies with this Act, the regulations and the adopted code.

(5) Every contractor who directs the activities of an employer involved in work at a work site shall ensure, as far as it is reasonably practicable to do so, that the employer complies with this Act, the regulations and the adopted code in respect of that work site.

RSA 2000 cO-2 s2;2002 c31 s3"

*Occupational Health and Safety **Regulation**:*

"Section 15: Safety Training

…

(3) If a worker may be exposed to a harmful substance at a work site, an employer must

(a) establish procedures that minimize the worker's exposure to the harmful substance, and

(b) ensure that a worker who may be exposed to the harmful substance

(i) is trained in the procedures,

(ii) applies the training, and

(iii) is informed of the health hazards associated with exposure to the harmful substance.

(4) A worker must participate in the training provided by an employer.

(5) A worker must apply the training referred to in subsections (1) and (3)."

*Occupational Health and Safety **Code**:*

"Part 2: Chemical Hazards, Biological Hazards and Harmful Substances

(review all sections of this part of the Code)" – available online here: http://humanservices.alberta.ca/working-in-alberta/307.html

"Part 4: Chemical Hazards, Biological Hazards and Harmful Substances

(review all sections of this part of the Code)" – available online here: http://humanservices.alberta.ca/working-in-alberta/307.html

"Part 18: Personal Protective Equipment

(review Sections 244(1) to 250(2) of this part of the Code)" – available online here: http://humanservices.alberta.ca/working-in-alberta/307.html

7.0 Asbestos Worker Training

Section 37 of the OHS Code requires that all workers who work with asbestos receive appropriate training.

Employees working in a restricted area (i.e. high risk abatement projects) must successfully complete an asbestos abatement course of at least 2 days duration approved by Alberta Human Services and receive an Asbestos Worker Card (course certification). A list of training agencies accredited to provide this worker training and issue Asbestos Worker Cards is available through the following website: http://humanservices.alberta.ca/working-in-alberta/1345.html

Employees involved in moderate and low risk abatement projects are not required to complete a two-day asbestos course and do not need an Asbestos Worker Card. However, these workers must receive training appropriate to their level of involvement in the project and at least cover all information presented in sections 5.2 and 5.3 of the Alberta Asbestos Abatement Manual.

This course is an asbestos awareness course only. It's purpose is to familiarize workers with asbestos, it's health effects, associated hazards, recognition of asbestos materials on campus and the University's asbestos management program.

This course alone does not qualify workers to remove asbestos materials following low, moderate or high risk abatement procedures. However, the information provided in this course can be used in conjunction with sections 5.2 and 5.3 of the Alberta Asbestos Abatement Manual to perform low or moderate-risk abatement. Note: All work activities requiring the disturbance of asbestos materials must be approved by the FHMC before proceeding.

Sections 5.2 and 5.3 of the Alberta Asbestos Abatement Manual (pgs. 50-59) can be at http://humanservices.alberta.ca/working-in-alberta/2988.html.

8.0 Contractor Responsibilities

Prime Contractors

External prime contractors working on campus have the following responsibilities regarding hazardous materials:

• Hire a qualified hazardous material abatement contractor who are on the University's Standing Order list (a list of contractors on Standing Order can be obtained from the University Project Manager/Coordinator for the project) or otherwise approved by the FHMC and pre-qualified through F&O Safety Division;

• Ensure that employees immediately stop work and notify the Environmental Consultant*/FHMC** if an unidentified suspect hazardous material is discovered within the work area;

• Comply with all other applicable Federal/Provincial health and safety legislation and University safety policies and procedures. For applicable University safety policies and procedures, refer to the University's "Contractor's Safety Manual" (available at: http://www.facilities.ualberta.ca/en/Operations_Maintenance/Health_and_Safety_Program/ContractorSafety.aspx)

**Note: An Environmental Consultant will be hired directly by the University Project Manager/Coordinator for each individual project to perform air monitoring and site inspections as necessary, unless otherwise specified.*

**University's Facilities Hazardous Material Coordinator (780) 248-1378.

Abatement Contractors

External hazardous material abatement contractors working on campus have the following responsibilities:

• Provide written acknowledgement that they will comply with Alberta regulations and guidelines (NOP & NOPA (for asbestos only), Site Specific Procedures, etc.), and post all documents on site for each project;

• Ensure that all University safety policies and procedures are followed in addition to Federal/Provincial legislation. For University safety policies and procedures as indicated in the University's "Contractor's Safety Manual";

• Ensure that all employees under their control are properly trained regarding the applicable hazards and abatement procedures prior to conducting any work that may disturb hazardous materials, and be able to provide proof of training on site (for asbestos);

• Ensure that all work activities are performed in a safe and professional manner and any damages made to the site as a result of abatement activities are kept as low as reasonably practicable;

• Ensure that employees immediately stop work and notify the Environmental Consultant/FHMC if an unidentified suspect hazardous material is discovered within the abatement work area;

• Ensure that all hazardous waste is properly bagged and disposed of in accordance with Alberta legislation.

Note: For additional site specific responsibilities of abatement contractors removing asbestos on campus, refer to Appendix I

Environmental Consultants

External environmental consultants working on campus have the following responsibilities:

• Ensure that the abatement contractor provides all relevant documentation before commencing abatement activities;

• Complete a pre-contamination inspection to confirm that all hazard control systems are in place prior to the abatement;

• Perform air monitoring and complete inspections of the abatement work area on a daily basis to review abatement procedures and containment integrity;

• Ensure that air results are provided to the abatement contractor on site within **24 Hours** of sampling and site inspection reports (SIRs) are provided to the University Project Manager/Coordinator and the FHMC within **24 Hours** for each day of site activities/air monitoring;

• Immediately report any discrepancies regarding abatement activities (i.e. containment breaches, elevated air results, inappropriate abatement procedures, changes in abatement scope, power shutdowns, etc.) to the Project Manager/Coordinator and FHMC;

• Provide documentation (i.e. SIR) that ensures all abatement work areas are safe for re-occupancy without the use of respiratory protection;

Environmental Consultants, continued

• Submit a 1 to 2-page letter-style final report for **ALL** hazardous material abatement projects summarizing the abatement project (refer to Appendix II for exact requirements);

• If bulk sampling of hazardous materials are required on campus, sampling must be conducted in accordance with Alberta guidelines and must meet University standards approved by the FHMC.

Note: For additional site specific responsibilities of Environmental Consultants working on campus, refer to Appendix II

9.0 Appendix I - Additional Abatement Contractor Responsibilities

General Responsibilities

1. Ensure that all workers adhere to the specific requirements in the Occupational Health and Safety Regulation that apply to asbestos.

2. Ensure all employees comply with the following requirements of Part 4 of the Occupational Health and Safety Code:

(a) minimize the release of asbestos into the air, keeping work exposure as low as reasonably achievable/practicable, but never exceeding the OEL;
(b) keep the work site clear of unnecessary accumulations of asbestos waste and materials containing asbestos;
(c) make sure that workers decontaminate themselves before leaving a restricted area.
ensure that decontamination of workers and materials does not result in release of airborne fibres;
(d) label all asbestos waste as “Carcinogenic — Do not inhale dust”;
(e) ensure that containers used to dispose of asbestos are sealed and impervious to asbestos;
(f) provide a means to prevent workers’ street clothes from being contaminated;
(g) ensure that only authorized persons enter a restricted area;
(h) post signs around restricted areas warning of the hazards and keep the signs posted until the area is no longer restricted; and
(i) provide workers with, and ensure they wear, appropriate protective clothing and respirators.

Laboratory Requirements

1. If partial abatement is required within an active laboratory on campus:

    a) Ensure that a “Clearance to Work in Laboratories” form has been completed by the Department of Environmental Health and Safety (EHS) and posted on the door of the lab where the work is occurring.

    b) This process is completed to verify that the abatement contractor’s work will not impact any chemicals/experiments within the lab.

    c) If there is no clearance form posted on the lab door, immediately contact the University Project Manager/Coordinator who will contact EHS to conduct an assessment.

2. If an entire laboratory is scheduled to be abated (i.e. high-risk abatement):

    a) Ensure that a “Hazardous Materials Closeout Procedure” form has been completed by the Department of Environmental Health and Safety (EHS) and posted on the door of the lab where the work is occurring.

    b) This process is completed to verify that all chemicals have been removed from the lab and abatement activities can commence.

    c) If there is no closeout form posted on the lab door, immediately contact the University Project Manager/Coordinator who will contact EHS to conduct an assessment.

Requirements for High-Risk and Moderate-Risk Containments
(Supplemental to the requirements established in the Alberta Asbestos Abatement Manual)

1. Use appropriate signage during abatement:
Place signs on the outside of the containment indicating the following:

Do Not Enter
Construction Area
Authorized Personnel Only

Place signs on the entrance to the shower/wash-down station (inside "clean room") of the decontamination facility of the containment indicating the following:

Danger Asbestos
Cancer and Lung Disease Hazard
Authorized Personnel Only
Respirators and Protective Clothing are Required is This Area

2. DO NOT WEAR PPE OUTSIDE ABATEMENT AREAS WITHIN PUBLIC ACCESSIBLE AREAS.

a) Do not wear disposable "Tyvek" coveralls outside the containment/abatement area. Coveralls must be donned inside the "clean room" before entering the abatement work area and removed inside the "dirty room" before leaving the abatement work area at all times.

b) Do not wear or store asbestos respirators outside the containment "clean room"/abatement control zone. Respirators must be donned inside the "clean room"/wash-down staging area before entering the abatement work area.

3. All bagged asbestos waste must be transported in a covered cart when being transported to outside bins/truck after regular work hours.

4. When removing floor levelling compound (FLC), do not remove beyond a depth of 2 inches from floor fissures/cracks to avoid breaking through the concrete slab. Encapsulate any residual FLC beyond this depth.

Requirements for Moderate-Risk Glovebag Work Areas
(Supplemental to the requirements established in the *Alberta Asbestos Abatement Manual*)

1. All glovebag abatement work areas must have a "control zone" of 6-10 feet around the asbestos work area. The control zone must be clearly taped off using proper asbestos banner tape indicating the following information:

Danger Asbestos
Cancer and Lung Disease Hazard
Authorized Personnel Only
Respirators and Protective Clothing are Required is This Area

2. All glovebag abatement work areas must have polyethylene drop sheets (minimum thickness of 6 mil) placed beneath each glovebag.

3. Ensure workers have a wash-down station (pail of warm soapy water and towels) just outside the "control zone" where workers can properly decontaminate themselves before leaving the work area. **DO NOT** use a nearby washroom as a wash-down station.

4. Do not wear disposable "Tyvek" coveralls outside the "control zone" of an abatement work area.

5. Do not wear or store asbestos respirators outside the "control zone" of an abatement work area.

6. All bagged asbestos waste must be covered when being transported to outside bins/truck after regular work hours.

10.0 Appendix II - Additional Env. Consultant Responsibilities

Requirements for Asbestos Abatement

1. Ensure that the asbestos abatement contractor provides all relevant documentation before starting an abatement project*, including:

- A copy of the Notification of Project (NOP) and Notification of Project Acknowledgement (NOPA);
- Written lock-out procedures and required permits (if necessary);
- Proof of proper worker training and valid Asbestos Worker Card;
- Site specific abatement procedures;
- Site specific emergency evacuation procedures;
- List of emergency contacts for the project;
- Certification of HEPA-filtered equipment including Negative Air Units (NAUs) and vacuums; and
- Code of practice for respiratory protection.

* In the case of emergency abatement activities (i.e. removal of asbestos on a ruptured pipe), exceptions may be made to allow removal before the submission of the above documentation.

2. For moderate-risk glovebag abatement projects, ensure that the asbestos abatement contractor has properly placed asbestos banner tape and polyethylene sheets within the work area before approving the start of abatement activities.

3. If fibre levels of area air samples exceed 10 percent of the Occupational Exposure Limit (OEL), work practices and/or the containment structure must be reviewed.

4. If fibre levels of area air samples exceed 50 percent of the Occupational Exposure Limit (OEL), work must stop until the reasons for the high levels are identified and corrected.

5. All environmental consultants must submit a 1 to 2-page letter-style final report to the FHMC for **ALL** asbestos abatement projects detailing the following information:

- Level of abatement (Low/Moderate/High);
- Material abated (i.e. vermiculite wall insulation, floor tile, etc.);
- Location of abatement (Building & Space);
- Abatement duration (start date and completion date);
- Personnel conducting the abatement (abatement contractor and environmental consultant);
- Approximately how much asbestos material was abated (i.e. for vermiculite - wall was 4ft high and 55 feet long, OR 35 fittings OR 500 ft2 of drywall, etc.); and
- Approximately how much asbestos material remains, what type(s) of material, and where
- **For all abatement projects involving multiple rooms, a floor plan MUST be attached indicating the abatement area and scope of work (for a copy of a floor plan, contact the PM/PC for the project or the FHMC).**

6. If hired directly by an external contractor, but working on University property, all documentation (i.e. SIRs, final reports, waste manifests, etc.) must still be sent to the FHMC.

Requirements for Asbestos Bulk Sampling

1. If a consultant is required by the University to collect bulk asbestos samples, all samples must be analyzed using the NIOSH Method 9002, Asbestos (bulk) by PLM by an independent laboratory with at least one of the following accreditations:

- NVLAP (National Voluntary Laboratory Accreditation Program);
- IHLAP (Industrial Hygiene Laboratory Accreditation Program); or
- CALA (Canadian Association for Laboratory Accreditation)

Note: If the laboratory is unrecognized by the University, proof of the lab's accreditation must be submitted to the FHMC.

2. All asbestos bulk sample descriptions must be documented according to the University's standardized "Hazmat Sampling Form"*. Material sample descriptions must include the following information:

- Accessibility
- Condition
- Colour
- Sample Location
- Sampling Date
- Material Type and Description
- Material Details (i.e. for floor tile – "with white streaks")
- Ceiling Tile Size and Pattern
- Sample in Return Air Plenum
- Asbestos Content and Percentage

*Contact the FHMC for a copy of the "Hazmat Sampling Form" Excel Document.