

## **ASBESTOS MANAGEMENT PROGRAM**

Occupational Health and Safety  
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## TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
TABLE OF CONTENTS.....	I
1.0 INTRODUCTION .....	1
1.1 Objectives.....	1
2.0 BACKGROUND .....	2
2.1 Asbestos.....	2
2.2 Asbestos Products .....	3
2.3 Asbestos Disturbances.....	3
2.4 Health Risk Related to Asbestos Exposure.....	4
2.5 Medical Assessment .....	6
2.6 Legislation .....	6
2.6.1 Provincial Regulations .....	6
2.6.2 Federal Regulations .....	8
3.0 ELEMENTS OF THE AMP .....	9
4.0 RESPONSIBILITIES.....	10
4.1 Facilities Management .....	10
4.2 Asbestos Consultant .....	11
4.3 Occupational Health and Safety Department is responsible for:.....	12
4.4 Asbestos Contractor.....	12
5.0 COMMUNICATION OF ASBESTOS AWARENESS .....	14
5.1 Employee Training .....	14
5.2 Notification.....	14
6.0 INSPECTIONS .....	15
6.1 Inventory of ACM.....	15
6.2 Periodic Inspections .....	16
6.3 Annual Inspections .....	16
7.0 GENERAL MAINTENANCE, RENOVATION AND CONSTRUCTION WORK.....	17
7.1 Contractor Notification Form .....	17
8.0 IDENTIFICATION AND CONTROL OF ASBESTOS- RELATED WORK	18
8.1 Asbestos Work Classifications .....	18
8.2 Repair and Maintenance of ACM .....	20
8.3 Emergency Procedures.....	20
8.4 Work to be Performed by Asbestos Abatement Contractor .....	21
8.5 Floor Plans .....	23
9.0 RECORD KEEPING .....	23
10.0 AIR MONITORING .....	24
10.1 Air Monitoring Regulatory Requirements .....	24
10.2 Air Monitoring General Considerations .....	24

11.0 WORKER ASBESTOS WORK REPORT ..... 26

**LIST OF APPENDICES**

Appendix I Asbestos Inventory and Site Plans

Appendix II Record Keeping Forms:  
*Form 1a & b* Asbestos Surveillance and Inspection  
*Form 2* Record of Asbestos Work  
*Form 3* Contractor Notification Form  
*Form 4* Employee Asbestos Work Report

Appendix III Asbestos Decision Matrix - Identification and Control

Appendix IV Asbestos Work Procedures:  
*Procedure 1* Stripping Wax and Buffing Asbestos-Containing Vinyl Floor Tiles - Type 1 Maintenance Operation Procedures  
*Procedure 2* Work with Manufactured Products- Removal of Small Amount of Damaged Asbestos-Containing Vinyl Floor Tile and/or Removal of less than 1 m<sup>2</sup> of drywall with asbestos joint compound - Type 1 Operations Procedures  
*Procedure 3* Emergency Response -Clean-up of ACM Debris - Type 2 Operation Procedures  
*Procedure 4* Emergency Response –Repair/ Removal of ACM - Type 2 Operation Procedures  
*Procedure 5* Respirators – Selection, Fitting, Inspection and Maintenance

Appendix V Asbestos Bulk Sample Collection

## 1.0 INTRODUCTION

Asbestos is a fibrous mineral that was used extensively from about 1900 until very recently in the manufacture of construction and industrial products, mostly due to its characteristics of strength, heat resistance and chemical resistance. Asbestos-containing materials (ACM) were also commonly used in building materials such as pipe and boiler insulation, texture finishes, floor and ceiling tiles, and spray applied for fireproofing and thermal insulation. While hazardous exposures to asbestos can result in serious health effects, the presence of asbestos in a building does not necessarily constitute a hazard or unacceptable risk to health. ACMs that are in good condition, undisturbed and well managed are not likely to release asbestos fibres into the air. Asbestos fibres are a concern when they become airborne as a result of disturbance or deterioration.

It is acknowledged that all ACM do not have to be removed or replaced to ensure a safe working environment, but proper control measures and procedures are required to prevent the disturbance of ACM and to protect maintenance staff and building occupants from exposure to harmful levels of airborne asbestos. .

### 1.1 Objectives

The objective of this plan is to protect the health and safety of building occupants and all persons who may potentially come into contact with or disturb ACM, and to comply with local and federal regulations governing asbestos. The Asbestos Management Program (AMP) has been developed to control exposure to asbestos and ACMs and to provide for the ongoing management of ACM in buildings.

The main objectives of the AMP are:

- **Maintain ACM in a safe condition:** This is accomplished through routine inspection of ACM, and use of qualified contractors to conduct clean up of asbestos-containing debris and repair of damaged ACM.
- **Prevent accidental disturbance of ACM:** This is accomplished by providing awareness training to maintenance staff to alert them to possible locations of ACM in buildings and teach them how to avoid accidental disturbance and what to do in the event of an emergency.

- **Respond safely to emergencies involving disturbance of ACM:** This is accomplished by providing procedures for responding to emergencies resulting from the accidental disturbance of ACM.
- **Satisfy regulatory requirements related to handling or disturbing ACM:** This is accomplished by adhering to the regulatory requirements as detailed within Ontario Regulation 278/05, Designated Substance — Asbestos on Construction Projects and in Buildings and Repair Operations, made under the Occupational Health and Safety Act (OH&S Act). and using only qualified workers or contractors to perform asbestos related work.

## 2.0 BACKGROUND

### 2.1 Asbestos

Asbestos is a generic term describing a number of naturally occurring fibrous metamorphic minerals of the hydrous magnesium silicate variety, that differ in chemical composition and are suitable for use as noncombustible, nonconducting and chemically resistant materials. The different types of asbestos which may be found in building materials are Chrysotile, Amosite, Tremolite, Actinolite or Anthrophyllite. They belong to two major mineral groups; Serpentine and Amphiboles. Serpentine minerals are flexible and curly whereas amphibole fibres tend to be straight with a fine fibre density that increases the likelihood of becoming and remaining airborne when disturbed. Chrysotile is a Serpentine and Amosite, Crocidolite, Tremolite, Actinolite, and Anthrophyllite are Amphiboles.

- **Chrysotile** is also known as *white* asbestos, even though its colour varies from gray-white to golden yellow to green. Chrysotile is a serpentine with a characteristic curly appearance and good fibre flexibility.
- **Amosite**, also known as *Grunerite* or *brown* asbestos is an amphibole from Africa. Amosite's name is based on its origin in the Asbestos Mines of South Africa.
- **Crocidolite**, also known as *blue* asbestos is an amphibole. Other asbestos minerals, such as **tremolite**, **actinolite**, and **anthophyllite** are less-used industrially but can still be found in a variety of construction materials / insulations and occur in a few consumer products, such as talcum powders and vermiculite.

## **2.2 Asbestos Products**

The characteristic physical and chemical properties of asbestos made it very useful for a wide variety of products to strengthen them, provide heat or electrical insulation, offer fire or chemical resistance, and/or to absorb sound. Asbestos was mined and used commercially in North America since the late 1800's and was commonly used until 1973. Although health and safety legislation put an end to the production of friable asbestos products in the early 1970's, some installation continued until the early 1980's. In fact, certain non-friable ACMs (such as gaskets, roofing materials and cement products) can still be used / installed in buildings in Ontario to this date.

Typical applications of asbestos include:

- Thermal and chemical insulation (i.e., pipe, boiler/heat exchanger and valve insulation, lagging, fire rated doors, limpet spray, and gaskets);
- Spray-on coating to protect steel beams from buckling in the event of fire;
- Fire-resistant textiles;
- Cement products including cement sheets and pipes for construction, casing for water and electrical/telecommunication services;
- Wallboards, joint compound filler, low density insulation board, acoustical ceiling tiles and panels;
- Roofing felts and shingles;
- Vinyl floor tiles, sheeting, adhesives, filler in resins, plastics, caulking and sealants; and
- Friction products such as brake pads, brake shoes and clutch plates.

## **2.3 Asbestos Disturbances**

In many cases, asbestos is present in materials in a “bound” form, meaning the product does not have the tendency to release fibres unless physically or mechanically disturbed. Such materials are referred to as “non-friable” materials. In other cases, the asbestos is friable, meaning the material, when dry, can be crumbled, pulverized or powdered by hand pressure and can readily release asbestos fibres. Deterioration,

accidental damage, or general maintenance activities such as cutting, sawing, breaking and rubbing of ACMs, can expose asbestos fibres, which can then become airborne and respirable. Examples of non-friable ACM includes floor tiles, asbestos cement products and gaskets. Fibre generation may occur as a result of any of the following actions on ACM:

- Contractors such as electricians, plumbers, carpenters performing work in a building;
- Water coming in contact with ACM resulting in damage;
- Friable asbestos being present within a plenum or air current;
- Storing materials and products on or adjacent to ACM that could cause damage;
- Uncontrolled asbestos abatement work;
- Routine maintenance activities;
- Renovation and demolition activities;
- Vandalism; and
- Building occupant damage.

#### **2.4 Health Risk Related to Asbestos Exposure**

Asbestos-related diseases are generally associated with exposure to high levels of asbestos over an extended period of time and generally do not appear for as long as 20-40 years after exposure. Generally, as exposure increases and more fibres are inhaled and retained in the lung, so does the risk of developing an asbestos-related disease. Consequently, measures must be in place to control the release of asbestos fibres and minimize exposures.

Studies on workers in mines, factories and shipyards have shown that exposures to asbestos can lead to the following diseases:

- ***Pleural effusions and plaques*** - Pleural effusions and plaques are collections of fluid and fibrous tissue (respectively) that collect on the inside of the chest wall, likely due to friction effects or inflammation caused by asbestos fibres. They do

not lead to cancer and normally do not affect lung function. The likelihood of developing pleural effusions and plaques is increased in persons having occupational exposure to asbestos, and can first appear on a chest x-ray within 10-15 years after first exposure.

- **Asbestosis** - Asbestosis is a permanent fibrotic scarring of lung tissue which results in a reduced ability to breathe, cardiovascular failure, and in severe cases, death. This disease occurs only with higher levels and longer duration of occupational exposure, and is not seen in the general population nor in persons who have had “bystander” or low level occupational exposure to asbestos. It will generally occur between 20 and 30 years after the first exposure to asbestos.
- **Lung Cancer** -The majority of lung cancers in the general population are probably due to smoking or environmental radiation, with a small proportion likely due to asbestos exposure. Asbestos-related lung cancers are most likely to occur when asbestosis is present; whether asbestos-related lung cancers will occur in the absence of asbestosis remain unclear. The types of tumours are very similar to those caused by cigarette smoking. Asbestos exposure and smoking together increase the risk for lung cancer greater than either asbestos exposure or smoking alone. For this reason, smokers who have had past or current exposure to asbestos are encouraged to stop smoking as soon as possible.
- **Mesothelioma** -Mesothelioma is a normally rare, but usually fatal, cancer that arises from the cells that form the lining of the lung. The risk for this cancer increases in proportion to the amount of asbestos fibres that have been inhaled. These tumours usually do not appear until after 30 years from first exposure. These tumours have no relationship to tobacco smoking, and the only means of prevention is to reduce further asbestos exposure.
- **Other Asbestos-Related Cancers** - Although the evidence is less clear, there is some suggestion that cancers of the gastrointestinal tract and larynx may be associated with asbestos exposure.

Amphibole fibres (e.g., amosite and crocidolite) are considered more hazardous than serpentine fibres (chrysotile) because of their physical characteristics. Amphibole fibres, which are needle-like and brittle, are more likely than chrysotile fibres to split into very fine fibres and become airborne. Chrysotile fibres are curly and are thicker than amphibole fibres. If inhaled, amphibole fibres are more likely to persist in the lungs than

serpentine fibres, which are more easily eliminated by the body's natural defence mechanisms.

## **2.5 Medical Assessment**

Asbestos-related diseases develop slowly over time and are usually not noticed by affected workers until they are at an advanced stage. In Ontario, to permit earlier detection of such diseases, Ontario Regulation 278/05 (refer to section 2.6.1 Provincial Regulations) prescribes a medical surveillance program for all workers who are exposed to asbestos on Type 2 or Type 3 operations (see section 8.1 Asbestos Work Classification). Under this program, employers are required to report the number of hours each employee works on each Type 2 or Type 3 operation to the Provincial Physician of the Ministry of Labour's Occupational Health Medical Service (see section 11 Worker Asbestos Work Report). The Provincial Physician keeps track of each worker's accumulated exposure and decides when a medical examination is required.

The medical examination consists of a medical questionnaire, chest X-rays and pulmonary function tests. Pulmonary or lung function tests measure lung capacity, or volume of air that can be held in the lungs. A reduced capacity may indicate early stages of asbestosis, which results in an inability to expand the lungs as fully as they should. Because this could be due to other causes, X-rays are also performed. Chest X-rays can show the fibrotic scarring at the lung bases that is characteristic of asbestosis. The early diagnosis of lung cancer is also possible with chest X-rays.

## **2.6 Legislation**

Health hazard concerns have prompted the development of federal and provincial legislation to restrict the use of asbestos to protect the health and safety of workers and building occupants. Regulatory requirements include exposure limits to airborne asbestos, worker protection and personal hygiene, work-site controls to prevent the spread of contamination, worker training and medical programs, and disposal requirements.

### **2.6.1 Provincial Regulations**

#### ***Ontario Regulation 278/05***

In Ontario, Regulation 278/05: Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations made under the Occupational Health and Safety Act (OH&S Act), outlines specific procedures with regards to maintenance,

renovations or demolition work where ACMs are or may be disturbed. This regulation requires that an asbestos management program be implemented in any building where the owner of a building knows or ought reasonably to know that friable ACM has been used in a building for any purpose related to the building, including insulation, and fireproofing (O. Reg. 278/05 s 7(2)). This provision is in effect until Nov 1, 2007 at which point, non-friable ACMs will also be included (O. Reg. 278/05 s(8)).

If ACM is suspected to be present, locations of the materials must be documented and re-inspected at regular intervals to determine their condition. Prior to a construction project or demolition project, a document detailing the presence of all asbestos materials must be available to contractors and subcontractors requesting tenders.

The main requirements of the asbestos management program for the building owner include:

- Preparation and maintenance of a record of locations of ACMs in the building, the record has to be updated at least once in each 12 month period;
- Notification of the building's occupants of the locations of such materials;
- Notification of workers who may do work that involves the material or is to be carried on in close proximity to the material and may disturb it;
- Establishment of a training program for those employees who may perform work involving ACM or in close proximity to and disturb it;
- Periodic re-inspections of ACM in order to determine its condition; and
- Remedial action on material that has deteriorated, following the precautions and procedures prescribed in the regulation.

The regulation is available on line at:

[http://www.e-laws.gov.on.ca/DBLaws/Regs/English/050278\\_e.htm](http://www.e-laws.gov.on.ca/DBLaws/Regs/English/050278_e.htm)

### ***Ontario Regulation 837***

Ontario Regulation 837, respecting Asbestos made under Occupational Health and Safety Act (R.R.O 1990, amended to O. Reg. 279/05) provides special requirements for protection of workers in asbestos mining and asbestos processing industries. This

regulation specifies that “every employer shall take all necessary measures and procedures by means of engineering controls, work practices, hygiene practices and facilities to ensure that the time-weighted average exposure of a worker to any of the forms of airborne asbestos, individually or collectively, is reduced to the lowest practical level and in any case shall not exceed 0.1 fibers per cubic centimeter of air” (R.R.O. Reg.837, s.4 (1)). The regulation is available on line at [http://www.e-laws.gov.on.ca/DBLaws/Regs/English/900837\\_e.htm](http://www.e-laws.gov.on.ca/DBLaws/Regs/English/900837_e.htm) .

### ***Ontario Regulation 347***

Ontario Regulation 347 under the Environmental Protection Act is intended to provide guidance on general waste management including asbestos and ACMs. The Ministry defines "asbestos waste" as the following: “solid or liquid waste that results from the removal of asbestos-containing construction or insulation materials or the manufacture of asbestos-containing products and contains asbestos in more than a trivial amount or proportion”.

Under this regulation, responsibilities of the building owner includes:

- To ensure that the waste is properly packaged and labelled;
- To ensure that asbestos waste is transported by a carrier operating under a certificate of approval that authorizes transportation of asbestos waste and the transport vehicle is appropriately placarded;
- To ensure that asbestos waste is transported to the waste disposal (operator of which has agreed to accept it) and has been advised on its anticipated time of arrival as well as that the asbestos waste is transported on the same day as received by the landfill site; and
- To ensure that the rout of travel is the most direct.

The building owner is held responsible for their asbestos waste as prescribed in the regulation until is accepted by the waste disposal site. The regulation is available on line at [http://www.e-laws.gov.on.ca/DBLaws/Regs/English/900347\\_e.htm](http://www.e-laws.gov.on.ca/DBLaws/Regs/English/900347_e.htm) .

## **2.6.2 Federal Regulations**

### ***Transportation of Dangerous Goods Regulations***

The transportation of asbestos-containing wastes is governed by Transportation of Dangerous Goods Regulations (SOR/2001-286) made under the Transportation of Dangerous Goods Act, 1992, which outlines the requirements for storage, handling, and transportation of such waste. These regulations govern the packaging mode of transport labeling, placard and documentation of asbestos waste while in transport.

The major requirement for the building owner is to ensure the waste meets the packaging requirements and that a bill of lading accompanies the shipment.

Transportation of Dangerous Goods Regulations are available on line at <http://www.tc.gc.ca/tdg/clear/tofc.htm>

### **3.0 ELEMENTS OF THE AMP**

Management of ACM in a building requires that all employees know their role and responsibilities and follow appropriate control procedures. The main elements of the AMP are;

- Responsibilities of program participants;
- Communication of asbestos awareness and training of employees involved in the program;
- Written inventory of ACM;
- Regular inspection program of all ACM to evaluate its condition and the need for remedial action;
- Risk assessment guidelines to assist in evaluating the potential for exposure to ACM during general maintenance, renovation and construction work (refer to Asbestos Decision Matrix in Appendix III);
- Maintenance of ACM in good condition;
- The prompt remediation of damaged or deteriorating ACM;
- Classification of all asbestos-related work as Type 1, 2 or 3 according to O. Reg. 278/05, and the provision of appropriate safe work procedures, including emergency procedures, in keeping with this classification of work;

- Maintenance of records of all asbestos-related work; and
- Maintenance of Asbestos Work Report (template provided in Appendix III) for each worker who work in a Type 2 or Type3 operation.

The details of the requirements of each element are presented below.

## **4.0 RESPONSIBILITIES**

### **4.1 Facilities Management**

The Director of Facilities Management is responsible for:

- Notifying employees and building occupants of the presence of ACM in their respective areas;
- Notifying employees of any planned or emergency asbestos-related work to be completed in their respective areas;
- Notifying contractors of the presence of ACM on Mohawk College property and assessing whether the ACM will be disturbed in the course of work to be performed;
  - If no disturbance of ACM is anticipated, the work can commence but the employee and/or contractor should be informed of the presence of asbestos and cautioned to avoid disturbance of the ACM.
  - If disturbance of ACM is anticipated, the scope of work must be assessed and arrangements must be made to have the affected ACM properly and effectively removed. A contractor notification form is attached in Appendix III Form 3.
- Ensuring the Ministry of Labour is notified of all Type 3 asbestos work;
- Ensuring ACM in buildings is reassessed at least annually or as otherwise deemed appropriate. The assessment should precede any planned renovations/demolition which may impact these materials;
- Providing the resources necessary to maintain the AMP;

- Informing the Occupational Health & Safety Department of all incidents, potential disturbances or asbestos related work to be performed;
- Informing the Occupational Health & Safety Office of incidents;
- Ensuring Facilities Management employees are aware of ACM in their work area(s); and
- Ensuring employees performing asbestos related work are properly trained and Asbestos Work Reports are completed for employees performing Type 2 or Type 3 work. Asbestos Work Reports must be completed annually and submitted to the Occupational Health & Safety Office.

#### **4.2 Asbestos Consultant**

A Consultant specializing in asbestos may be retained to provide assistance with specific tasks required under the AMP. Based on the experience and specific expertise, the Consultant may provide assistance with the following:

- Identification of all visible ACM in each building, (a copy of each asbestos survey has been completed and is included in Appendix II of the AMP);
- Development of low, moderate and high-risk work procedures (Type 1, 2, or 3) for planned renovation or removal of ACM;
- Development and implementation of Type 2 procedures to facilitate emergency clean up and control of disturbed or damaged ACM;
- Assisting with all matters concerning the AMP including performing annual re-assessments and updating the lists of remaining ACM in the buildings;
- Inspecting asbestos contractor containment and work procedures before, during, and after work has commenced to ensure negative pressure and prevent exposures to asbestos fibers for non-asbestos workers or other building occupants during Type 2 or Type 3 operations;
- Conducting air monitoring once the asbestos work has commenced to monitor dust control and decontamination procedures for Type 3 operations; and

- Conducting air clearance testing following Type 3 abatement activities. Reviewing and approving test results (where asbestos fibres have been disturbed) to ensure the area is safe for occupancy.

#### **4.2 Occupational Health and Safety Department**

Occupational Health & Safety Department is responsible for:

- Coordinating the development and review of the AMP;.
- Maintaining and updating all written elements of the AMP including new codes or regulations as well as keeping a current record of the remaining ACM within the building after asbestos removal projects;
- Providing copies of records, drawings and inventories as required;
- Maintaining copies of training records;
- Consulting on asbestos projects, related issues and investigate incidents involving asbestos; and
- Notifying the JHSC of asbestos related work and incidents as required.

#### **4.4 Asbestos Contractor**

A contractor specializing in asbestos abatement would be required to complete maintenance, clean-ups, repairs and abatement work. Workers must be properly trained in the hazards of asbestos exposure, personal hygiene and work practice and the use, cleaning and disposal of respirators and protective clothing. Effective Nov. 01, 2007 workers performing Type 3 must have successfully completed an Asbestos Abatement Worker Training Program approved by the Ministry of Training, Colleges and Universities, and every supervisor of a worker involved in a Type 3 operation must have successfully completed an Asbestos Abatement Supervisor Training Program approved by the Ministry of Training, Colleges and Universities (O. Reg. 278/05, s. 20 (1)).

The Asbestos Contractor shall be responsible for the following:

- The provision of asbestos abatement services, authorized by the AMP Project Manager and/or his authorized representative, for planned or emergency abatement;
- Notification of asbestos abatement projects, orally and in writing, to an inspector at the nearest office of the Ontario Ministry of Labour, prior to commencing any Type 3 operation (O. Reg. 278/05, s. 11 (1)) and Type 2 operations if 1 square meter or more of insulation to be removed using glove bag procedures (O. Reg. 278/05, s. 11 (2));
- Abiding by Ontario Ministry of Labour Regulations during planned or emergency abatement;
- Posting warning signs in English and erecting barricades at the work site, prior to commencing work;
- Providing and protecting all manpower, tools and equipment to conduct the work. As well, ensuring all utilities such as necessary power and water are connected properly and isolated to the work area;
- Ensuring that all abatement workers wear the appropriate personal protective equipment required to comply with applicable Ontario Ministry of Labour regulatory requirements and guidelines appropriate for the type of work procedures to be conducted;
- Cleaning and decontaminating equipment, work area and workers;
- Inspecting work area upon completion and ensuring there are no visible signs of dust on surfaces;
- Providing a certificate of authorization for transferring and disposing of asbestos waste by an authorized carrier to an accepted landfill;
- Ensuring all asbestos waste generated is disposed of by the last day of the abatement work. Should temporary storage be required on site, asbestos waste must be packaged in 6 mil polyethylene bags or wrapped in polyethylene sheeting and sealed with duct tape. Store waste materials awaiting disposal in designated area within the work area. Asbestos waste must be stored in a labeled and locked storage container; and

- Maintain Workers' Compensation insurance in accordance with the statutory requirements of Ontario and comply with all applicable statutory and regulatory requirements.

## **5.0 COMMUNICATION OF ASBESTOS AWARENESS**

### **5.1 Employee Training**

An asbestos communication and awareness strategy primarily includes the training of supervisors, maintenance personnel, and contractors pertaining to the presence of asbestos at Mohawk College Campuses. The objective of the awareness training is to inform site personnel of the presence of asbestos with the objective that informed personnel are less likely to disturb or impact ACM. It also serves to provide site specific information of the potential hazards of asbestos.

All employees who participate in the AMP should receive asbestos awareness training. The training should provide a general awareness of the hazard of ACM and general understanding of asbestos abatement work activities; how they are to be conducted or managed in accordance with the requirements of O. Reg. 278/05. Employees should be able to identify work that requires Type 1 procedures, understand the asbestos exposure hazard associated with the work, and carry out the work accordingly.

Maintenance staff who may be selected to perform some Type 2 work require a full day Asbestos Remediation Training course. The objective of this training is to ensure workers can distinguish between Type 1 and emergency Type 2 operations, understand the exposure hazard associated with the work and be able to carry out the work according to the procedures prescribed in O. Reg. 278/05.

Training records should be kept and maintained by the Occupational Health & Safety Department. .

### **5.2 Notification**

Once ACM have been identified, all maintenance staff and building occupants must be informed of the presence of asbestos. This awareness serves to provide basic information of the potential hazards of asbestos within the buildings. Once site personnel are informed, it is less likely that disturbances will occur.

Building occupants should be notified of the presence of ACMs in the area they are occupying. Notification should be done using a standard form letter. New occupants should also be notified prior to occupancy.

Outside contracted personnel who need to enter buildings to perform maintenance and may work with or around ACM should also be notified (see section 7.1 Contractor Notification Form).

Notification should include the following information:

- The exact location of the areas found to contain asbestos;
- The condition of the asbestos;
- Health hazards associated with asbestos exposures; and
- Reporting procedures in the event of an uncontrolled release.

## **6.0 INSPECTIONS**

### **6.1 Inventory of ACM**

The AMP begins with locating all ACMs within a building. Non-destructive asbestos surveys have been completed and copies of survey reports are included in Appendix II. These reports are also available through Facilities Management and the Occupational Health & Safety Department.

Each survey report documents all accessible and suspect ACMs within the buildings. In order to determine the type and extent of ACMs in the buildings, a thorough inspection of the buildings and building systems was undertaken. Substantial efforts were made to identify and inspect all accessible areas for the content of asbestos within each building. However, ACMs may be present within concealed locations such as wall cavities and solid ceilings. Further investigation of inaccessible areas would be required if renovation or demolition activities are planned.

The systems that were reviewed as part of the inspections were as follows:

- **Structural** - The method of construction of the buildings was determined, including interior office areas and roofing support systems. Fireproofing, fire-stop, and other materials installed as a part of the structure were reviewed.

- **Mechanical** - Building mechanical systems such as the heating, ventilating and air conditioning (HVAC) systems were inspected for the presence of ACMs. The inspection included insulation on ductwork, pipe work and fittings, such as steam, condensate, and domestic hot and cold water.
- **Architectural** - The presence of ACMs was assessed in building materials and finishes such as floor and ceiling tiles, texture coats, asbestos sheet materials, wall joint compound, and spray-applied insulation on areas of the structure.

Representative samples of suspected ACM were submitted to an independent laboratory for analysis. The analysis determined the asbestos type and percentage content using Polarized Light Microscopy in accordance with U.S. Environmental Protection Agency (USEPA) methodologies and dispersion staining techniques (EPA 600/R-93/116).

## **6.2 Periodic Inspections**

Periodic inspections are an integral part of the AMP. Inspections consist of routine checks completed by trained maintenance personnel or an outside qualified Health and Safety Consultant and are conducted in order to monitor the condition of the materials and the need for cleanup or abatement measures.

## **6.3 Annual Inspections**

Inspections of all identified ACM must be conducted on an annual basis to identify damaged or deteriorated materials so corrective actions can be implemented. Inspection personnel must be aware of the correct procedures to be utilized to reduce any hazard.

The Asbestos Surveillance and Inspection Form has been developed for this purpose and is provided in Appendix III.

Periodically, the inspection may uncover a building product that may require sampling to determine the presence of asbestos. Bulk samples shall be taken in accordance with the standard procedure for Bulk Material Collection provided in Appendix VI. Sampling can only be conducted by a person who has been properly trained in the procedure. Sample analysis must be performed by independent accredited laboratories.

## **7.0 GENERAL MAINTENANCE, RENOVATION AND CONSTRUCTION WORK**

During routine work activities, maintenance personnel may be potentially exposed to asbestos fibres. The Facilities Management representative is responsible for reviewing all maintenance work for the possibility of disturbance of asbestos materials. The objective is to identify hazards associated with asbestos before the commencement of the maintenance work. A detailed Decision Matrix – Identification and Control has been provided in Appendix IV for reference purposes.

The Facilities Management representative should determine if there is ACM in the area of maintenance activities. Upon review of the Asbestos Inventory, if it is determined that ACM would not likely be disturbed by the maintenance work, caution the maintenance staff of the presence of ACM.

If there is friable or non-friable asbestos materials in the area of maintenance, and this will be disturbed by the intended work, the Facilities Management representative must determine the appropriate course of action. At the completion of any work which involves asbestos removal or repair, a report must be provided to the Occupational Health & Safety office. A template for Record of Asbestos Work is provided in Appendix III.

If there are friable or non-friable asbestos materials in the renovation area, but the materials will not be disturbed by the contracted work, the contractor must be notified, in writing, of the presence of the asbestos materials.

### **7.1 Contractor Notification Form**

The objective of the Contractor Notification Form is to serve as a record for the College that contracted personnel have reviewed the potential asbestos hazards for a specific work area. The notification should also identify asbestos hazards in the work area, limitations, type and location of ACM, as well as address any factors that could affect the health and safety of the workers involved with the project. A template of the Contractor Notification Form is provided in Appendix III.

## **8.0 IDENTIFICATION AND CONTROL OF ASBESTOS- RELATED WORK**

### **8.1 Asbestos Work Classifications**

Any activities that involve disturbance of ACMs are strictly regulated. O. Reg. 278/05 defines three classification of asbestos work, Types 1, 2 and 3, based on the asbestos hazard they present. The airborne concentration of asbestos generated by the work and the duration of exposure are the two main factors used to evaluate the hazard.

**O. Reg. 278 defines Type 1, Type 2, and Type 3 as follow:**

#### ***Type 1 Operations***

A Type 1 operation is defined as one that does not generate appreciable levels of airborne asbestos fibres and generally presents little hazard to workers or bystanders. It includes the following:

- Removing non-friable ACM, such as vinyl floor tiles, transite products, roofing materials, if the material is removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
- Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable ACM if the material is wetted to control the spread of dust or fibres, and the work is done only by means of non-powered hand-held tools.
- Installing or removing ceiling tiles that are ACM, if the tiles cover an area less than 7.5 square metres and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
- Removing less than one square metre of drywall in which joint-filling compounds that are asbestos-containing material have been used.

#### ***Type 2 Operations***

Type 2 operations are small scale activities which may generate enough airborne asbestos to require protective equipment, but are short lived. Short lived activities are less than one shift for any single project. Type 2 operations include the following:

- Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable ACM if the material is not wetted to control the spread of dust or fibres, and the work is done only by means of non-powered hand-held tools or if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.
- The removal or disturbance of one square metre or less of friable ACM during the repair, alteration, maintenance or demolition.
- Repairs of friable ACM including enclosing or applying tape, sealant or other covering to pipe / boiler insulation that is asbestos-containing material.
- Removing asbestos-containing thermal mechanical insulations from a pipe, duct or similar structure using a glove bag.
- Removing all or part of a false ceiling to obtain access to a work area, if ACM is likely to be lying on the surface of the false ceiling.
- Installing or removing ceiling tiles that are ACM, if the tiles cover an area of 7.5 square metres or more and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
- Removing one square metre or more of drywall in which joint filling compounds that are ACM have been used.
- Cleaning or removing filters used in air handling equipment in a building that has sprayed fireproofing that is ACM.

### **Type 3 Operations**

Type 3 asbestos operations are generally large scale activities which may generate significant airborne asbestos levels, may occur frequently, are of longer duration, and may pose a serious risk both to workers and to bystanders. Type 3 operations include:

- The removal or disturbance of more than one square metre of friable ACM during the repair, alteration, maintenance or demolition.
- Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable ACM, if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.

- The spray application of a sealant to friable ACM.
- Cleaning or removing air handling equipment, including rigid ducting but not including filters, in a building that has sprayed fireproofing that is ACM.
- Repairing, altering or demolishing all or part of a kiln, metallurgical furnace or similar structure that is made in part of refractory materials that are ACM.

For a more explicit definition of the three types of asbestos operations, refer to the O. Reg 278/05 s12.

## **8.2 Repair and Maintenance of ACM**

In general, asbestos related work at Mohawk College will be performed by qualified Asbestos Abatement Contractors. Mohawk College employees will not, under any circumstances, perform Type 3 asbestos work. All Type 3 work will be performed in accordance with the work specification prepared by an Asbestos Consultant.

The involvement of Mohawk College employees with ACM is generally limited to the operation and regular maintenance of the buildings. Employees may be required to perform limited Type 1 or Type 2 work (such as an emergency response or repair) and will be trained accordingly. Type 2 emergency procedures refer to situation which if not attended immediately, could negatively affect the building and its occupants.

Standardized work procedures for Mohawk College maintenance personnel have been prepared for Type 1 and Type 2 Emergency Procedures only for reference purposes (Appendix V- Asbestos Work Procedures). These recommended work procedures and respiratory protection are tailored to the likelihood and severity of asbestos disturbance and the potential or exposure of workers and other building occupants to airborne asbestos fibres.

## **8.3 Emergency Procedures**

An emergency situation is defined as an unplanned event that may result in an uncontrollable release of airborne contaminants that can result in worker exposure. Disturbance can occur during normal degradation, routine maintenance and renovation activities and acts of nature. When damage to ACM has resulted in a potential fibre release, the damage must be repaired and the affected area decontaminated. Facilities Management and the Occupational Health & Safety Department must be notified of the emergency and must respond immediately.

Emergency procedures classified as Type 2 operations may be handled by Building Maintenance Personnel who have completed training as detailed in section 5.1 of this AMP, or by a qualified asbestos contractor.

**Type 2 emergency procedures include:**

- Cleaning of asbestos-containing debris;
- Repair of less than 1 m<sup>2</sup> of damaged asbestos-containing texture finish, wall plaster, spray-applied fireproofing or;
- Repair/minor removal of less than 1 m<sup>2</sup> of damaged asbestos-containing Thermal Mechanical Insulation (parging cement insulation, parging cement over fibreglass insulation, and paper wrap insulation).

Standardized Type 2 emergency procedures are outlined in Appendix V Procedures 3 and 4.

**8.4 Work to be Performed by Asbestos Abatement Contractor**

Asbestos Abatement Contractors may perform the following Type 1 operations; emergency and non-emergency Type 2 and all Type 3 work in accordance with a work specification prepared by the Asbestos Consultant.

**Type 1**

- Removal of non-friable ACM, such as vinyl floor tiles, sweatwraps, transite products and roofing materials (if found to contain asbestos), if the material is removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
- Removal of less than one square metre of drywall in which asbestos containing drywall joint compound have been used.
- Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable ACM if the material is wetted to control the spread of dust or fibres, and the work is done only by means of non-powered hand-held tools.

**Type 2**

- Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable ACM (vinyl floor tiles, sweatwraps, transite products and roofing materials (if found to contain asbestos)) if the material is not wetted to control the spread of dust or fibres, and the work is done only by means of non-powered hand-held tools or if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.
- Removal of one square metre or more of drywall in which asbestos containing drywall joint compound have been used.
- The removal or disturbance of one square metre or less of friable ACM such as; parging cement insulation, parging cement over fibreglass insulation, paper wrap insulation, texture finish, wall plaster, spray applied fireproofing and fire-rated door core (if verified to contain asbestos) during the repair, alteration, maintenance or demolition.
- Repairs of friable ACM listed above, including enclosing or applying tape, sealant or other covering to Thermal Mechanical Insulation that is friable ACM.
- Removing asbestos-containing Thermal Mechanical Insulation (parging cement insulation, parging cement over fibreglass insulation, paper wrap insulation), from a pipe, duct or similar structure using a glove bag.

### **Type 3**

- The removal or disturbance of more than one square metre of friable ACM such as; parging cement insulation, parging cement over fibreglass insulation, paper wrap insulation, texture finish, wall plaster, spray-applied fireproofing and fire-rated door core (if verified to contain asbestos, during the repair, alteration, maintenance or demolition.
- Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable ACM (vinyl floor tiles, sweatwraps, transite products and roofing materials (if found to contain asbestos)), if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.
- The spray application of a sealant to friable ACM (texture finish, wall plaster, spray-applied fireproofing).

## **8.5 Floor Plans**

Floor plans are provided in Appendix II of this AMP and can be obtained through Facilities Management or Occupational Health and Safety. These plans are to be used to indicate locations where ACM sampling has been conducted and for referencing rooms and areas where ACMs have been identified. The floor plans may also be marked to indicate where ACMs are located. As ACMs are removed from the buildings, floor plans shall be updated and amended by the Occupational health & Safety Department.

## **9.0 RECORD KEEPING**

All written records will be maintained as part of the record keeping process as appropriate. These include:

- The AMP itself;
- Asbestos Inventories and Site Plans (Appendix II);
- Asbestos Surveillance and Inspection Forms (templates enclosed in Appendix III);
- Record of Asbestos Work -documentation of maintenance, repairs, and emergency actions (template enclosed in Appendix III);
- Records of Waste Disposal – a bill of lading or waste manifest with a weigh bill ticket from the landfill site;
- Contractor Notification Form (template enclosed in Appendix III);
- Employee Training Records;
- Respiratory protection program (Appendix V –Procedure 5) and
- Employee Asbestos Work Reports for workers involved in Type 2 and Type 3 operations (template provided in Appendix III).

## **10.0 AIR MONITORING**

### **10.1 Air Monitoring Regulatory Requirements**

O. Reg. 278/05 specifies clearance air sampling requirement for all Type 3 asbestos operations except for exterior demolition projects. The regulation states that the work area inside the enclosure passes the clearance air test only if every air sample collected has a concentration of fibers that does not exceed 0.01 fibers per cubic centimeter of air (f/cc) (O. Reg. 278/05, s.18 (6)).

The R.R.O 1990, Reg.837 amended to O. Reg. 279/05 specifies that every employer shall take all necessary measures and procedures by means of engineering controls, work practices, hygiene practices and facilities to ensure that the time-weighted average exposure of a worker to any of the forms of airborne asbestos, individually or collectively, is reduced to the lowest practical level and in any case shall not exceed 0.1 f/cc (R.R.O. Reg.837, s.4(1)).

Since there is no established standards regulating airborne asbestos fibre concentrations in ambient air, the lowest of the available standards should be used as a comparison. Therefore, the criterion of 0.01 f/cc should be used for evaluation of ambient air monitoring results.

### **10.2 Air Monitoring General Considerations**

Air monitoring is required for all Type 3 asbestos abatement projects and will performed by a qualified person (typically the Asbestos Consultant). Air samples will be obtained using calibrated sampling pumps and mixed cellulose ester filters for analysis utilizing Phase Contrast Microscopy (PCM) techniques in accordance with the U.S. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7400, Issue 2: Asbestos and other Fibres by PCM (August 15, 1994), which is adopted as a standard protocol by the Ontario Ministry of Labour for clearance air testing, using Phase Contrast Microscopy (O.Reg. 278/05 s18 (6)). The method gives an index of airborne fibres and it does not differentiate between asbestos and other fibres. Fibres that are less than 5 micrometers in length and thinner than about 0.2 micrometers are not reported.

The typical air monitoring program for asbestos abatement projects includes clearance air sampling as well as background, personal, and area sampling.

- **Background Sampling** – before the start of the abatement activities, samples may be collected for documentation and comparative purposes.
- **Personal Sampling** – during the abatement process, samples can be taken in the breathing zone of the worker in order to check for the effectiveness of dust suppression techniques being utilized and to ensure that proper respiratory protection has been selected. Samples should be collected from a worker in the work area completing the dirtiest work activity. The air sample pump must be hung on a belt around the worker's waist and the filter holder is to be attached to the workers coverall collar. The filter must be pointed downward.
- **Area Sampling** – during the abatement process, area samples are collected around potential leakage points within the containment barrier, down stream from exhausts of negative air units, near the waste load out area and in the clean room of the decontamination facility. Samples and visual assessments of the work areas should be undertaken during each shift. The Asbestos Consultant should point out observed deficiencies and give written instructions to the Facilities' Management designate to instigate the necessary changes. Ambient air samples may be collected outside the Type3 enclosures. Samples shall be collected from areas adjacent to the work enclosure. The objective is to assess potential fibre migration from the asbestos abatement work area into non-work areas.
- **Clearance Sampling** – upon the completion of all Type 3 work, the area shall be visually reviewed by the Asbestos Consultant. Final air clearance sampling will be collected after at least 8-12 hours of drying time, following washing of all surfaces inside the containment. The purpose is to capture any remaining fibres and to determine air quality prior to re-occupancy of the space.

Considering limitations of the PCM method, air monitoring inside an occupied building where ACM may have been disturbed, or a need to establish fibre level has been requested, may be conducted using Transmission Electron Microscopy (TEM) method. This technique incorporates fibre identification so only asbestos fibres are reported. In addition, instrumental resolution of TEM is adequate to allow detection of fine asbestos fibres. However, since no standards for asbestos air quality monitoring inside the general occupancy building have been established, comparison outdoor samples may have to be collected for evaluation of asbestos concentrations inside the general occupancy buildings.

## **11.0 WORKER ASBESTOS WORK REPORT**

Facilities Management is responsible for preparing Employee Asbestos Work Report (template provided in Appendix III) for each Mohawk College employees who work in a Type 2 or Type 3 operation. This report shall be completed annually or immediately upon termination of the employment of the worker. The report shall be submitted to the Provincial Physician, Ministry of Labour, and a copy given to the worker. The Provincial Physician, Ministry of Labour maintains an Asbestos Workers Register listing the name of each worker for whom an employer submits an asbestos work report.

On the recommendation of the Provincial Physician, a worker who is listed in the Register may volunteer to undergo the medical examination consisting of a medical questionnaire, chest x-rays and pulmonary function tests.

END.

**APPENDIX I**

**ASBESTOS INVENTORY AND SITE PLANS**

(Available through Facility Management or Occupational Health & Safety Department)



## APPENDIX II

### RECORD KEEPING FORMS:

<i>Form 1 a &amp; b</i>	<b>Asbestos Surveillance and Inspection</b>
<i>Form 2</i>	<b>Record of Asbestos Work</b>
<i>Form 3</i>	<b>Contractor Notification Form</b>
<i>Form 4</i>	<b>Employee Asbestos Work Report</b>

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