City of Guelph

Asbestos Management Plan

Including
Standard Operating Procedures

Last Update: February 13, 2007

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Executive Summary

The City of Guelph recognizes that as a concerned building owner, it has a responsibility to protect its staff, building occupants, and the public from hazardous building materials. Scientific and medical evidence has shown that asbestos-containing material can be harmful to the human body. This concern prompted the City of Guelph to inspect their buildings for the presence of asbestos, a Ministry of Labour Designated Substance that has been used in the construction industry for a number of years. Reports detailing the findings of these inspections are available in the buildings Maintenance Department.

The City recognizes that asbestos does not pose a significant health risk if it is properly managed. Consequently, it has developed an Asbestos Management Plan. Copies of the Asbestos Management Plan are available for review at the Health and Safety Department and the Corporate Property Division. These Departments also contain copies of Asbestos Training manuals.

Our Asbestos Program Manager has decided to undertake a series of actions to reduce the amount of asbestos present in the building, as well as the potential for contact with any remaining material. These actions will significantly reduce the impact that asbestos containing materials can have and ensure compliance with Ministry of Labour Regulations.

For more details regarding the Asbestos Management Plan and the specific abatement decisions, please contact:

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Introduction

Power Environmental was retained by the City of Guelph to assist in the development of an Asbestos Management Program in accordance with Ontario Regulation 278/05 (O. Reg. 278/05) "Designated Substances – Asbestos on Constructions Projects and in Building and Repair Operations". The need to develop an Asbestos Management Program was based on an asbestos survey of City owned facilities conducted by Lex Scientific of Guelph, Ontario in 2005/2006. The asbestos survey and analysis of suspect materials determined asbestos to be present in some of the facilities.

The purpose of the management program is to protect employees, outside contractors and building occupants from asbestos exposures by:

- Identification and recording of the locations of all building materials containing asbestos;
- Providing awareness training to City staff who have the potential to come into contact with asbestos-containing material;
- Control and monitoring of external contractors performing work which may disturb asbestos containing materials;
- Cleaning up asbestos-containing debris caused by damaged or deteriorating material;
- Preventing further release by minimizing disturbance of asbestos-containing material; and
- Monitoring the condition of asbestos-containing material and maintaining it in a good state of repair.

For the program to be effective those involved in it must be properly trained and the appropriate procedures carefully followed.

A key component of the Asbestos Management Plan is the Standard Operating Procedures (SOP) which prescribes procedures for the handling of asbestos containing materials or debris.

1 Asbestos

1.1 Background Information

Asbestos is a mineral rock mined from the earth in much the same way as other minerals, such as iron, lead, and copper. However, unlike other materials, asbestos can be fractured into smaller bundles and individual fibres. All asbestos varieties exhibit substantial resistance to heat and chemicals, and thus have been used for a variety of commercial and industrial purposes. In fact, asbestos has been used in more than 3,000 products.

Asbestos has been used since ancient times in various textile applications and some was used as insulation during the period from 1870 to 1900, but its use became more common on steam pipes and boilers in ships after 1900. Until the early 1940s, most asbestos-containing insulation in the United States and Canada contained chrysotile from Canada. After the 1940s, amosite came into common use on high temperature applications such as steam lines.

The use of asbestos started expanding to include acoustical and decorative purposes, especially in buildings. After WWII ended and military demand for asbestos declined, spray applied asbestos fireproofing was used extensively in buildings. Estimates indicate that more than half the large multistory buildings constructed during the 1950 to 1970 period contain some form of spray-applied asbestos-containing materials. Asbestos use in the United States started to decline in the period from 1973 to 1978 when EPA bans on spray-applied asbestos materials were established. In Ontario, the installation of friable asbestos containing materials was not banned by legislation until 1986. However, most contractors and building owners followed the US EPA lead in the mid 1970s and voluntarily stopped using asbestos.

Much of the concern about the large quantities of asbestos-containing materials in buildings is due to the established association of respiratory diseases with long-term exposure to the inhalation of asbestos fibres. The three major respiratory diseases associated with asbestos are asbestosis, lung cancer, and mesothelioma, a rare cancer of the outer lining of the lung. Asbestos-related diseases are subject to latency periods of as much as 25 to 40 years.

1.2 Types, Uses and Applications

1.2.1 Types of Asbestos

Asbestos is a naturally occurring hydrated mineral silicate characterized by fibres or bundles of fine single crystals fibres. Veins of asbestos occur in the Northeastern and Northwestern United States, Canada, Alaska, Russia, Africa and other locations. Once the asbestos is mined as ore, it is milled to free the fibres from the rock and the fibres from each other.

There are primarily three forms of asbestos that have been incorporated into building and mechanical materials in Canada. These are chrysotile, amosite, and crocidolite.

- **Chrysotile** is white in colour and has a serpentine structure with long flexible fibres. It is the most commonly used form of asbestos comprising 60% to 90% of all asbestos found in asbestos-containing materials. Chrysotile has been mined in Canada since the 1870s.

- **Amosite** is brown in colour and has an amphibole structure which resembles rods similar to small wooden dowels. The fibres have a solid-core, are brittle and have spurs jutting out over their surface. Amosite comprises 10% to 40% of the asbestos used in building materials and has been mined in South Africa since 1916.

- **Crocidolite** is blue in colour and like amosite has an amphibole structure. Crocidolite is relatively rare; comprising only 1% to 2% of the asbestos used in building materials, and has been mined in Africa since the 1890s.

Picture of Chrysotile Asbestos Rock

Other common forms of asbestos are anthrophyllite, tremolite and actinolite; but these are rarely found in building applications.

1.2.2 Asbestos Applications

Prior to 1978, asbestos was incorporated in different products because of its high tensile strength, flexibility, heat and chemical resistance, and low cost. Due to its physical characteristics, asbestos can be spun and woven. It also is used as structural reinforcement for materials such as cement.

Asbestos-containing materials are classifies into three different categories:

- **Surfacing Materials** are asbestos-containing materials which have been sprayed or toweled on surfaces (walls, ceilings, structural members) for acoustical, decorative or fireproofing insulation.

- **Thermal System Insulation** is used to inhibit heat transfer to prevent condensation on pipes, boilers, tanks, ducts and various other components of hot and cold water systems and HVAC systems, (e.g. pipe lagging, pipe wrap, mag block, batten, blanket insulation, cements, mud, gaskets and ropes).

- **Miscellaneous Materials** are other mostly non-friable products and materials (e.g. floor tiles, ceiling tiles, roofing felts, concrete pipe, outdoor siding and fabrics).

Damaged Asbestos Pipe Elbow

Asbestos-containing materials are considered **friable** if they can be crushed, crumbled or pulverized by hand pressure and are in a condition where they may release fibres. Conversely, asbestos-containing materials are **non-friable** if they cannot be crushed, crumbled or pulverized by hand pressure and are not in a condition where they may release fibres.

2 Legislation Governing Asbestos Control

Ontario Regulation 278/05 (O. Reg. 278/05) entitled, the *Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations – made under the Occupational Health and Safety Act*, was developed to address both friable and non-friable asbestos-containing materials. The intent of the Regulation is to prevent or limit exposure to airborne asbestos fibres. O. Reg. 278/05 also bans the new installation of materials containing 0.1 per cent or more asbestos by dry weight that can become friable and provides guidance on the handling of existing asbestos in building.

O. Reg. 278/05 requires that a management program designed to prevent worker exposure to airborne asbestos fibres be established in buildings where asbestos is known to be present. This program includes training of employees who may disturb asbestos and routine inspection and maintenance of the materials.

Although asbestos is not considered a hazardous waste, Regulation 558 – made under the Ontario Environmental Protection Act, does define specific requirements for the disposal of materials containing friable asbestos at landfills. These requirements include proper labeling and containment of the material; as well as notifying the landfill that the waste is asbestos.

2.1 Legislation Requirements for an Asbestos Management Program

Based on the asbestos surveys and laboratory analysis of suspect materials, it was established that friable and non-friable asbestos-containing materials are present in some City owned buildings. Consequently, in accordance with O. Reg. 278/05, the City is required to implement an Asbestos Management Program. The Asbestos Management Program is required to include the following actions and documents:

- Prepare and keep on the premises an asbestos record;
- Give any other person who is an occupier of the building written notice of any information in the record that relates to the area occupied by the person;
- Give any employer with whom the owner arranges or contracts for work written notice of the information in the record, if the work,
  - May involve material mentioned in the record, or
  - May be carried on in close proximity to such material and may disturb it;
- Advise the employees employed by the owner who work in the building of the information in the record, if the employees may do work that,
  - Involves material mentioned in the record, or
  - Is to be carried on in close proximity to such material and may disturb it;
- Establish and maintain, for the training and instruction of every worker employed by the owner who works in the building and may do work described in clause (d), a program dealing with,
  - The hazards of asbestos exposure,

- The use, care and disposal of protective equipment and clothing to be used and worn when doing the work,
- Personal hygiene to be observed when doing the work, and
- The measures and procedures prescribed by this Regulation; and
- Inspect the material mentioned in the record at reasonable intervals in order to determine its condition.

The asbestos record shall contain the following information:

- The location of the material,
- Whether the material is friable or non-friable,
- In the case of friable sprayed on material, for each location,
  - If the material is known to contain asbestos, the type of asbestos, if known, or;
  - In any other case, a statement that the material will be treated as though it contained a type of asbestos other than chrysotile.

If there is a discovery of friable material that is suspected to contain asbestos, appropriate action to control and or abate the suspect material(s) must be conducted in accordance with O. Reg. 278/05

2.2 General Asbestos Air Quality Criteria

Table 2.2 presents asbestos air quality criteria generally used in the industry to determine an acceptable level of airborne asbestos fibres.

Table 2.2
Asbestos Air quality Criteria

DESCRIPTION	FIBRE CONCENTRATION (fibres per cubic centimetre of air)
Ont. MOL maximum time-weighted average exposure(1)	0.1
Ont. MOL clearance level(2)	0.01

Notes:

(1) Maximum average concentration of asbestos to which an employee may be exposed, based on an eight-hour day and 40-hour week, as given in Ont. Reg. 279/05. This is mainly applicable to manufacturers using asbestos and the mining of asbestos.

(2) Maximum air-borne fibre concentrations measure via Phase Contrast Microscopy (PCM), using the NIOSH 7400 method, at the conclusion of Type 3 asbestos abatement activities, prior to tear down of containment barriers (O. Reg. 278/05).

3 Health Effects

3.1 Health Effects Associated with Asbestos Exposure

The results of studies and epidemiological investigations have demonstrated that the inhalation of asbestos fibres may lead to an increased risk of developing one or more diseases. Exactly why some people develop these diseases and others do not is unknown. In this discussion, each of the major diseases associated with asbestos will be examined, along with the risk and how that risk can be minimized.

It is important to recognize that the majority of people who have developed a disease as a result of asbestos exposure were asbestos employees, textile employees, or people who worked in asbestos mines or manufactured products out of asbestos. These employees were frequently exposed to high concentrations of asbestos fibres each working day with little or no protection. The asbestos abatement worker of today follows specific work practices and wears appropriate protection, including respirators, to minimize the risk of exposure.

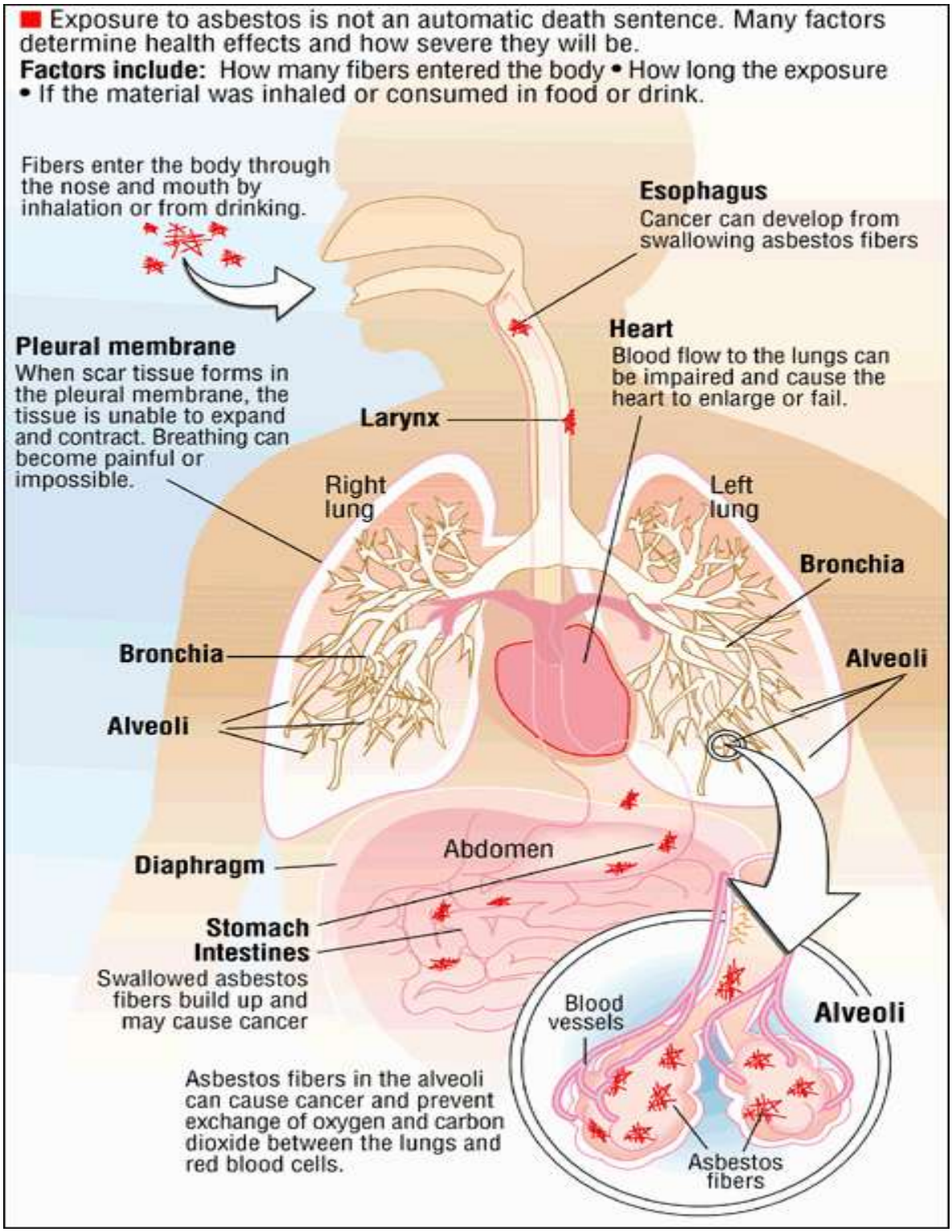
3.2 The Respiratory System

The primary health effects of asbestos are due to inhalation of asbestos fibres. A brief discussion of the respiratory system will help in understanding these effects. As air is breathed into the body, it passes through the mouth and moves into the windpipe or *trachea*. The trachea splits into two smaller airways called *bronchi*. These divide into smaller and smaller tubes which terminate into air sacs called *alveoli*. In these air sacs, oxygen is absorbed into small blood vessels, and waste gases such as carbon dioxide pass out of the blood.

The lung itself is divided into two halves and sits in the pleural cavity. This cavity and the outside of the lung itself have a Saran-wrap type lining. The pleural cavity and lung linings are in contact with each other and are very moist. Just like two panes of glass with a drop of water between them, these linings slide easily across each other, but are very difficult to pull apart. Accordingly, as the chest cavity expands, the lungs expand and air rushes in. If these linings (mesothelia) were to become damaged, inhalation could not occur properly.

The body has several mechanisms by which it “filters” the air it breathes. First, very large particles are removed in the nose and mouth. Many smaller particles impact on the mucous-coated walls of the airways and are caught. These airways have a hair-like lining (ciliated cells) which constantly beats upward. Accordingly, particles caught in the mucous are swept up into the back of the mouth. From here they are swallowed or expelled.

The Respiratory System



Cigarette smoking temporarily paralyzes the ciliated cells, inhibiting one of the body's natural defenses against unwanted dust. As the smoker sleeps, the hair-like cells start working again and carry large amounts of mucous into the back of the mouth. This causes the so-called "smoker's hack" in the morning. After the first cigarette or two, the cleaning mechanism is paralyzed again and the coughing stops. It should now be evident why cigarette smokers who are exposed to asbestos appear to be at greater risk. Other reasons will also be discussed later in this section.

Even with the aforementioned natural defenses of the body, some dust particles inevitably reach the tiny air sacs. When this occurs, large cells (*macrophages*) attempt to engulf the particle and "digest" it. For this reason, they are sometimes called the lung's garbage collectors. However, because asbestos is a mineral fibre, the macrophages are often not successful. In a secondary defense mechanism, these cells deposit a coating on the fibres that are inhaled and much scar tissue is formed; a condition then develops known as asbestosis.

3.3 Asbestosis

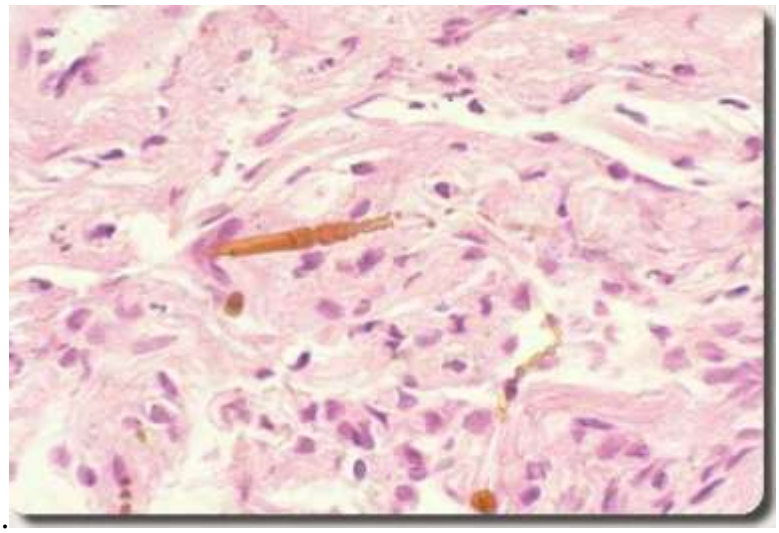
Asbestosis is a non-malignant, progressive, irreversible lung disease characterized by fibrotic scarring of the lung. It is a restrictive lung disease which reduces the capacity of the lung. The common symptom is shortness of breath. Asbestosis is prevalent among employees who have been exposed to fibres over a long period of time. Accordingly, there is a clear dose-response relationship between asbestos exposure and development of this disease. This means that the greater the asbestos exposure, the more likely asbestosis will develop. As with all forms of asbestos exposure, it may take many years for the disease to develop. The typical latency period for asbestos is 15 to 30 years. An asbestos abatement worker using work practices and protective equipment described in this manual will have a much smaller likelihood of developing asbestosis as a result of his or her work.

3.4 Lung Cancer

Lung cancer is the uncontrolled growth of abnormal cells in the lung or lungs. There are many causes of lung cancer, of which asbestos is only one. While employees exposed to industrial concentrations of asbestos in years past have an increased risk of getting lung cancer (5 times), their risk is not as great as that of cigarette smokers (10 times). These two factors operate together, and a cigarette smoker who also works with asbestos is 50 times more likely to contract lung cancer than the normal population. Like asbestosis, there exists a long lag time between initial exposure and the occurrence of lung cancer, typically 20 to 30 years. There appears to be a dose-response relationship between asbestos exposure and lung cancer, although no "safe level" has yet been determined. Again, these figures relate to past industrial situations where employees wore little or no

protective equipment. Proper protection and work practices will substantially lessen the risk of abatement employees getting lung cancer due to asbestos.

Picture of Asbestos in the Lungs



3.5 Mesothelioma

The asbestos-associated disease of greatest concern in asbestos abatement is mesothelioma. Fortunately, it is also the rarest. Mesothelioma is a cancer of the mesothelium or chest cavity lining. Although exposure to asbestos has been strongly associated with most cases of mesothelioma, some cases may occur without asbestos exposure. Mesothelioma can also occur in the lining of the abdominal cavity.

If it occurs in the chest cavity, it is called *pleural mesothelioma*. In the abdominal cavity, it is known as *peritoneal mesothelioma*. This type of cancer spreads very rapidly and is always fatal. The exact cause remains unknown. There does not appear to be any increased risk of mesothelioma for smokers and there does not appear to be a dose-response relationship between asbestos exposure and mesothelioma. Cases have been recorded where the person's asbestos exposure has been limited. Like the other diseases of asbestos, mesothelioma takes 30 to 40 years after initial exposure, if it occurs.

3.6 Other Diseases

Several other diseases are found more often among persons exposed to asbestos than the normal population. These include cancer of the esophagus, stomach, colon, and pancreas, pleural plaques, pleural thickening, and pleural effusion. The incidence of these health effects is much less than lung cancer. Again, the importance of using the proper work

practices and protective equipment cannot be overemphasized to minimize the occurrence of these diseases due to unnecessary asbestos exposure.

4 Standard Operating Procedures (SOP)

4.1 Introduction

The principal objective of Standard Operating Procedures is to minimize exposure of both City staff and the public to asbestos fibres. To accomplish this objective, an SOP includes work practices:

- To monitor the condition of the ACM;
- To maintain asbestos-containing materials in good condition;
- To ensure the proper cleanup of asbestos fibres previously released; and
- To prevent further release of asbestos fibres.

The SOP contained in this document shall be used in conjunction with all applicable Federal and Provincial Regulations. Copies of key Regulations are appended to this document for reference. The Asbestos Management Plan shall remain in effect until ALL asbestos-containing building materials (ACM) have been removed from the applicable building or structure.

The sole responsibility for implementation, control and day-to-day performance of the SOP lies with the Asbestos Program Manager who shall be fully trained, thoroughly knowledgeable of all asbestos regulations, and ensure that the regulations are strictly adhered to. All maintenance and custodial employees who are required to work in close proximity to ACM shall also be fully trained.

The MOL Regulation places asbestos operations into three classifications depending on their potential to create an asbestos exposure.

The following are **Type 1 Operations**:

a) Installing or removing ceiling tiles that are asbestos-containing material, 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.
b) Installing or removing non-friable asbestos-containing material, other than ceiling tiles, if the material is installed or removed without being broken, cut, drilled, abraded, ground, sanded, or vibrated.
c) Breaking, cutting, drilling, abrading, grinding, sanding, or vibrating non-friable asbestos-containing material 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.

d) Removing less than one square metre of drywall in which joint-filling compounds containing asbestos have been used.

The Following are **Type 2 Operations**:

a) Removing all or part of a false ceiling to obtain access to a work area, if asbestos-containing material is likely to be lying on the surface of the false ceiling.
b) The removal or disturbance of one square metre or less of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of machinery or equipment or a building, aircraft, locomotive, railway car, vehicle or ship.
c) Enclosing friable asbestos-containing material.
d) Applying tape or a sealant or other covering to pipe or boiler insulation that is asbestos-containing material.
e) Installing or removing ceiling tiles that are asbestos-containing material, 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.
f) Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material 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.
g) Removing one square metre or more of drywall in which joint filling compounds containing asbestos have been used.
h) Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.
i) Removing insulation that is asbestos-containing material from a pipe, duct or similar structure using a glove bag.
j) Cleaning or removing filters used in air handling equipment in a building that has sprayed fireproofing that is asbestos-containing material.
k) An operation that,
    - Is not mentioned in any of paragraphs (a) to (j),
    - May expose a worker to asbestos, and;
    - Is not classified as a Type 1 or Type 3 operation.

The Following are **Type 3 Operations**:

a) The removal or disturbance of more than one square metre of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of a building, aircraft, ship, locomotive railway car or vehicle or any machinery or equipment.
b) The spray application of a sealant to friable asbestos-containing material.
c) Cleaning or removing air handling equipment, including rigid ducting but not including filters, in a building that has sprayed fireproofing that is asbestos-containing material.

d) 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 asbestos-containing materials.
e) Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material, if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.
f) Repairing, altering or demolishing all or part of any building in which asbestos is or was used in the manufacture of products, unless the asbestos was cleaned up and removed before March 16, 1986.

Work on ceiling tiles, drywall or friable asbestos-containing material is classified according to the total area on which work is done consecutively in a room or enclosed are, even if the work is divided into smaller jobs.

The SOP includes the following elements:

- **Training:** Asbestos Program Manager, and custodial and maintenance staff training.
- **Notification:** A program to inform building staff hired contractors where ACM is located, and how and why to avoid disturbing the ACM. All persons whose work may affect and disturb ACM or employees working in the vicinity of ACM will be properly informed of the dangers of the exposure to asbestos materials.
- **Worker Protection:** Medical and respiratory protection programs, as applicable.
- **Surveillance:** Regular ACM surveillance to note, assess, and document any changes in the ACM's condition.
- **Record-Keeping:** To document SOP activities.
- **Work Practices:** Establish SOP work practices to avoid or minimize fibre release during activities affecting ACM.
- **Controls:** Work control/permit system to control activities which might disturb ACM.
- **Asbestos Emergency Incident Procedures:** To respond to accidental damage of ACM.

4.1.1 Work Control/Permit System

The SOP includes a system to control all work that could disturb both friable and non-friable ACM.

This includes a "work permit" program, which requires the person requesting the work to submit a Job Request Form to the Asbestos Program Manager before any maintenance or renovation work is begun in a facility that contains friable asbestos. The form gives the time and location of the requested work, the type of maintenance needed, and available information about any ACM in the vicinity of the requested work. Any contractor or other person authorized to perform the work will also be identified on the work request.

Once a task has been approved, repeat Job Request Forms for that task are not required.

A Job Request Form is not required in buildings that only have non-friable forms of asbestos present, unless the work involves disturbing the asbestos.

Upon receiving a pre-work Job Request Form, the Asbestos Program Manager should take the following steps:

- Refer to written records, building plans and specifications, and any ACM inspection reports to determine whether ACM is present in the area where work will occur. If ACM is present, but it is not anticipated that the material will be disturbed, the Asbestos Program Manager should note the presence of the ACM on the permit form and provide additional instruction on the importance of not disturbing the ACM.
- If ACM is both present and likely to be disturbed, the Asbestos Program Manager or a designated person qualified by training or experience should visit the site and determine the work practices that should be instituted to minimize the release of asbestos fibres during the maintenance activity.
- This determination should be recorded on the Maintenance Work Authorization Form, which is then sent to the in-house maintenance supervisor or to the maintenance contractor to authorize the work.
- The Asbestos Program Manager should make sure that a copy of both the request and the authorization forms (if granted) are placed in the permanent file.
- Where the task is not covered by previously approved standard work practices, the Asbestos Program Manager should make sure that the appropriate work practices and protective measures are used for the job.
- For all jobs where contact with ACM is likely, the Asbestos Program Manager or a designated person qualified by training or experience should visit the work site when the work begins to see that the job is being performed properly. For lengthy jobs where disturbance of ACM is intended or likely, periodic inspections should be made for the duration of the project.

4.1.2 Use of Outside Contractors for Asbestos Abatement

At a minimum, contracts with service trades or abatement companies should include the following provisions to ensure that the service or abatement employees can and will follow appropriate work practices:

- Proof that the contractor’s employees have been properly notified about ACM in the owner’s building and that they are properly trained and accredited (if necessary) to work with ACM.
- Copies of respiratory protection, medical surveillance, and worker training documentation as required by O. Reg. 278/05.
- Notification to building staff and the City Health, Safety, and Wellness Coordinator, occupants and visitors that abatement activity is underway (performed by the Asbestos Program Manager).

- Written work practices must be submitted by the vendor or contractor for approval or modification by the Asbestos Program Manager. The vendor or contractor should then agree to abide by the work practices as finally accepted by the Asbestos Program Manager.
- Assurance that the contractor will use proper work area isolation techniques, proper equipment, and sound waste practices.
- Historical air monitoring data for representative examples of the contractor's previous projects, with emphasis on projects similar to those likely to be encountered in the building.
- Provisions for inspections of the area by the owner's representative to ensure that the area is acceptable for re-entry of occupants/tenants.
- A resume for each abatement contractor/supervisor or maintenance crew chief, known as the "competent person."
- Criteria to be used for determining successful completion of the work (i.e., visual inspections and clearance air monitoring for Type 3 Operations).
- Any of the information deemed necessary by the owner's legal counsel.
- Notification to the MOL for Type 2 and Type 3 operations as required.

4.2 Asbestos Records

Appendix E contains documentation for this building or group of buildings which identifies all accessible ACM by type, percentage, condition, location, accessibility and approximate extent or identifies where such records can be found. The Asbestos Program Manager has complete copies of the asbestos surveys for all City owned buildings.

Record keeping and constant up-dates to the records is essential to a good Asbestos Management Plan. All the building asbestos management documents discussed in this Manual (inspection and assessment reports, SOP work practices and procedures, respirator use procedures, fibre release reports, application for maintenance work and work approval forms, evaluations of work affecting ACM, and re-inspections of ACM) are stored in permanent files held by the Asbestos Program Manager.

The City will make available all written elements of the SOP to the building's staff as well as to other building occupants, if applicable.

All friable ACM in service and maintenance rooms will be labeled as ACM or have signs identifying the presence of asbestos containing materials. The posted signs should read as "Caution. Asbestos Do Not Disturb" and be placed directly adjacent to the ACM to alert and remind maintenance employees not to inadvertently disturb the ACM. In most cases, all boilers, pipes, and other equipment with ACM in service areas where damage may occur will have prominent warning signs placed next to the ACM.

Should future renovation and/or demolition activities reveal materials suspected of containing asbestos and which were not noted in the asbestos survey records; the Asbestos Program Manager should immediately be notified of the discovery. The sampling and testing of any such suspect materials will be undertaken and the records

updated. The removal and handling of the ACM will be performed in accordance with O. Reg. 278/05 and as noted in the SOP.

4.3 Worker Notification

Certain City owned facilities contain known ACM. It is required by law that all employees who have a potential to come into contact with the material be fully informed of the ACM for everyone's protection. These employees (i.e. Maintenance personnel) will be identified by the Asbestos Program Manager and shall be made aware of key elements of this document (i.e. Asbestos Management Plan) as part of their Asbestos Awareness Training.

Each Department Manager will receive a copy of this document and training on its use. The Manager must sign a receipt (see **Appendix B**) to confirm that he or she has had the opportunity to review this document.

A yearly up-date of the manual will be made so that it is current with Ministry of Labour Regulations. The asbestos survey reports for each facility will be updated when the asbestos is removed due to damage or to facilitate maintenance or renovation activities.

4.4 Asbestos Awareness Training

The law requires that all employees who work in close proximity to and may disturb ACM must be given awareness training. Therefore, as part of the implementation of the Standard Operating Procedures for this building, these employees shall attend an Asbestos Awareness training program. Employees hired after program implementation shall be trained from commencement of employment by qualified staff or a Consultant. A signed roster of all attendees will be kept by the Asbestos Program Manager.

All persons receiving awareness training should have a clear understanding of the following points with respect to specific building conditions associated with the facility:

- Health Effects of Asbestos Exposure
  - types and properties of asbestos
  - routes of entry
  - asbestosis, cancer, other health effects
  - effects of concentration and exposure duration
- Uses of Asbestos
  - products made from asbestos
  - risks of different types of materials (friable/non-friable)
  - recognition of asbestos-containing building materials
  - how asbestos in buildings can be a hazard
- Overview of Relevant Sections of O. Reg. 278/05
  - application to buildings
  - requirement for an Asbestos Management Plan
- The Asbestos Management Plan

  - purpose of management plan
  - elements of management program
  - person responsible for program in the building
- Limitations of Training
  - should caution workers and building occupants not to perform work or conduct activities that may disturb asbestos-containing materials
  - who to contact in the event of an emergency

Appendix G contains a copy of the following regulations for use by the employees: O. Reg. 278/05 The "Regulation Respecting Asbestos on Construction Project and in Building and Repair Operation".

4.5 Asbestos Worker/Handler Training

4.5.1 General

City employees will not disturb friable ACM unless properly trained and have written approval from the Asbestos Program Manager. The Asbestos Program Manager has available the services of a qualified asbestos abatement contractor to remove friable asbestos. The City recognizes that employees may need to disturb non-friable ACM such as "Transite" type siding and pipes (a mixture of cement and asbestos) or asbestos vinyl floor tiles during the normal course of their work. The individuals involved will receive Asbestos Worker/Handler Training in order for them to perform these tasks.

The intent of this training is to enable the worker to perform Type 1 and certain Type 2 Operations as defined by the MOL. This will enable city staff to respond in-house to incidences which can cause damage to non-friable ACM. As well, minor non-friable asbestos removals can be done to facilitate equipment repair, to accommodate renovations and upgrades, or to remove asbestos which has the potential for damage.

4.5.2 Employee Protection

a) Respiratory Protection

If requested by the employee, the City will provide a respirator to be used by the employee when performing a Type 1 Operation. Under MOL regulations, a respirator is not mandatory for Type 1 operations but is required for Type 2 operations.

The selection of approved respirators, suitable for the hazards to which the employee is exposed, is only one aspect of a complete respiratory protection program. Other elements include written operating procedures for respirator use; outlining personnel responsibilities for respirator cleaning, storage and repair; medical examination of employees for respirator use; training in proper respirator use and limitations; respirator fit testing; respirator cleaning and care; and work-site supervision. The respirator program will be administered by the City Health, Safety & Wellness Coordinator and the Asbestos Program Manager.

Proper respiratory protection is an integral part of all custodial and maintenance activities involving potential exposure to asbestos. The MOL specifies general types of respirators for protection against airborne asbestos during "construction" activities, which include abatement, renovation, maintenance, repair, and remodeling.

When adequate care is taken to prevent or minimize and control fibre release; routine, small/short-duration maintenance or custodial tasks are not likely to generate high levels of airborne asbestos and respirators which filter breathing air will provide sufficient employee protection. The respirator required by the MOL is an air purifying half-mask respirator with N-100, R-100 or P-100 particulate filters. **MOL, EPA, and NIOSH are on record as *not* recommending single use, disposable paper dust masks for use against asbestos; in fact MOL has *disallowed their use* against airborne asbestos fibres.**

For additional information on respirator programs, respirator types, and respirator use, the building owner or Asbestos Program Manager may want to use the following references:

- Ontario Regulation 278/05, Ministry of Labour;
- "Respiratory Protection: An Employer's Manual", NIOSH, October 1978;
- "A Guide to Respiratory Protection for the Asbestos Abatement Industry," EPA/NIOSH, 1986;
- OSHA Respirator Standard (29 CFR 1910.134);
- OSHA Asbestos Regulations (29 CFR 1910.1001 and 1926.58);
- "Occupational Exposure Sampling Strategy Manual," NIOSH #77-173, January 1977;
- "Respirator Decision Logic," NIOSH, May 1987; and
- "NIOSH Guide to Industrial Respiratory Protection," September 1, 1987.

b) Protective Clothing

If requested by the employee, the City will provide protective clothing to be used by the employee when performing a Type 1 Operation. Under MOL regulations, protective clothing is not mandatory for Type 1 operations but is required for Type 2 operations.

Most often, protective clothing is disposable and consists of coveralls, a head cover, and foot covers made of a synthetic fabric which does not allow asbestos fibres to pass through. This type of clothing prevents employees' regular clothing from becoming contaminated with asbestos fibres. Contaminated clothing could be taken home, creating a possible risk to family members.

Ontario Regulation 278/05 only requires employees to wear protective clothing whenever they are exposed, or are likely to be exposed, to fibre levels above permissible levels such as during Type 2 and Type 3 Operations. It is important that employees be properly trained in the use, removal and disposal of protective clothing.

4.6 Asbestos Program Manager Training

The Asbestos Program Manager must take a comprehensive training course which contains all the training modules required under the Ontario Ministry of Labour training guidelines. These modules include the following topics:

History and uses of Asbestos
Health Effects and Medical Surveillance
Overview of Ontario Asbestos Regulations
Liability
Limitations of Training
Principles of Remedial Measures
Uses and Interpretations of Asbestos Records
Classification of Work:
- Type 1 Procedures
- Type 2 Procedures
- Type 3 Procedures

Respirator Training
Use, Care and Disposal of Protective Clothing
Inspecting Buildings for Asbestos
Assessing the Potential for Asbestos Exposure

4.7 Cleaning Areas and Procedures

All facilities where ACM is present have had the ACM stabilized or removed and have been properly cleaned prior to the inception of this program. Subsequent cleaning shall be done upon completion of any future maintenance, renovation, or emergency activity that disturbs ACM.

Proper cleaning will involve the use of wet cleaning or wet-wiping practices to pick up asbestos fibres. Dry sweeping or dusting can result in asbestos fibres being re-suspended into the building's air and therefore should not be used. Once wet cloths, rags, or mops have been used to pick up asbestos fibres, they should be properly discarded as asbestos waste while still wet. They should not be allowed to dry out, since the collected fibres might be released at some later time when disturbed. The use of special vacuum cleaners, commonly referred to as HEPA vacuums, may be preferable to wet cleaning in certain situations. These vacuums are equipped with filters designed to remove very small particles or fibres – such as asbestos – by filtering those particles from the air passing through the vacuum. An ordinary vacuum should not be used as the exhaust air is not filtered sufficiently and it is possible for tiny asbestos fibres to pass through the filter and back into the building air.

It is important for employees to use caution when emptying HEPA vacuums and changing filters. Exposure could result from such activities. Employees should move the HEPA vacuum to a physically isolated area of the facility or outdoors and put on proper

personal protective equipment before changing filters and bagging them for disposal as asbestos-containing waste.

If ACM has been released onto a carpeted area of a building, it may not always be possible to adequately clean the carpeted area. “Steam” cleaning and HEPA vacuuming methods are sometimes employed for this purpose.

For carpets, successful cleaning will likely depend on factors such as the amount of ACM released onto the carpet, how long the situation has existed, traffic over the area, as well as the structure and composition of the carpet itself. It is prudent to evaluate individual situations on a case-by-case basis. The Asbestos Program Manager should consider the need for employees engaged in cleaning asbestos fibre-contaminated carpets to wear proper respiratory protection. It may also be prudent to arrange for this type of cleaning to be done after normal working ours or when the facility is less occupied. Additionally, it may be more cost effective to properly dispose of contaminated carpets and other fabrics as asbestos-containing waste if a permanent asbestos control option is being undertaken in the building.

All work shall be done by in-house maintenance staff that have received Asbestos Worker/Handler Training and shall take place after hours or during periods of low activity (i.e., nights or weekends) if possible.

4.8 Emergency Response Procedures

An “emergency” is any disturbance of ACM which causes the release of asbestos fibres. ANY DISTURBANCE OF ACM MUST BE ADDRESSED IMMEDIATELY

Any employee who determines that there has been a release of asbestos fibres shall immediately notify their Supervisor who, in turn, will notify the Asbestos Program Manager and relay the location and the extent of the damage. The Asbestos Program Manager will then institute the appropriate response action and document the incident on an Employee Incident Report (Fibre Release Episode Report) (**Appendix D**).

Fibre releases can be termed “minor” or “major”. The determination of the type of release is generally the classification of the operation. The following guidelines will apply:

- Minor Release: are situations requiring a Type 2 cleanup
- Major Release: are situations requiring a Type 3 cleanup

The following sections describe actions to be taken once the type of release has been determined. The Asbestos Program Manager shall determine the type of release and the cleanup procedures to be followed.

4.8.1 Minor Release Episode (Type 2)

Any minor release episode will be abated following Type 2 procedures as defined by the MOL and the following shall apply:

- The area shall be immediately isolated as determined by the Asbestos Program Manager. This may include physical barriers such as locking doors or roping the area off with caution tape and a shutdown of the HVAC systems.
- Personal protective equipment shall be worn if it is necessary to work in the area of the release.
- The cleanup shall be done by specially train maintenance staff under the direction of the asbestos program manager or by an outside asbestos abatement contractor.
- All action taken shall be fully documented on a Fibre Release Episode Report form and submitted to the Asbestos Program Manager.

4.8.2 Major Release Episode (Type 3)

Any major release episode shall require the immediate isolation of all affected areas and the involvement of an asbestos abatement contractor. A major release episode is a significant concern as it can result in the contamination of large areas of the building.

In the event of an accidental large disturbance of ACM during a routine maintenance or renovation activity, the employees shall:

- NOTIFY THE ASBESTOS PROGRAM MANGER, and

The Asbestos Program Manager shall:

- Contact an asbestos abatement contractor
- Initiate isolation of the contaminated area and evacuation as deemed necessary
- Install asbestos hazard warning signs
- Work with the abatement contractor on remedial measures of the contaminated area
- Oversee abatement activity to ensure all regulations are strictly adhered to by the contractor
- Document the episode on a Fibre Release Episode Report. Document any problems or mishaps during the project. File all information with the Management Plan for permanent record

4.9 Disturbance of ACM for Maintenance and/or Renovation Activities

All activities conducted in areas containing ACM shall be documented on a Work Permit (**Appendix C**) and approved by the Asbestos Program Manager. All outside contractors providing services to the City shall be informed of ACM in affected facilities and be given a copy of the asbestos survey report, where appropriate, for review. Only asbestos specially trained maintenance staff or abatement contractors specialized in this field will

be allowed to disturb any asbestos present. All activities will be closely monitored by the Asbestos Program Manager or a designated person and be documented for permanent record in the Management Plan.

The scheduled disturbance of ACM shall be classified as Type 1, Type 2 or Type 3 operations in accordance with the MOL designations. The Asbestos Program Manager shall determine the classification.

The following sections describe actions to be taken by trained maintenance staff or an outside contractor hired to abate the asbestos as appropriate.

4.9.1 Type 1 Operation

Measures and Procedures, Type 1 operations

The following measures and procedures apply to Type 1 operations:

- Before beginning work, visible dust shall be removed with a damp cloth or a vacuum equipped with a HEPA filter from any surface in the work area, including the thing to be worked on, if the dust on that surface is likely to be disturbed.
- The spread of dust from the work area shall be controlled by measures appropriate to the work to be done including the use of drop sheets of polyethylene or other suitable material that is impervious to asbestos.
- In the case of removing less than one square metre of drywall in which asbestos joint filling compound has been used; the material shall be wetted before and kept wet during the work to control the spread of dust or fibre, unless wetting would create a hazard or cause damage.
- A wetting agent (surfactant) shall be added to water that is to be used to control the spread of dust and fibre.
- Frequently and at regular intervals during the doing of the work and immediately on completion of the work,
    - Dust and waste shall be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a yellow asbestos waste bag,
    - Drop sheets shall be wetted and placed in a yellow asbestos waste bag.
- Drop sheets shall not be reused.
- After the work is completed, polyethylene sheeting and similar materials used for barriers and enclosures shall not be reused, but shall be wetted and placed in a yellow asbestos waste bag.
- After the work is completed, barriers and portable enclosures that will be reused shall be cleaned, by using a vacuum equipped with a HEPA filter or by damp wiping.
- Barriers and portable enclosures shall not be reused unless they are rigid and can be cleaned thoroughly.
- Compressed air shall not be used to clean up and remove dust from any surface.
- Eating, drinking, chewing or smoking shall not be permitted in the work area.

- If an employee of the City or a worker for a contractor requests that he or she be provided with a respirator to be used by the employee or worker, the employer shall provide the worker with a NIOSH approved half-face respirator equipped with N-100, R-100, or P-100 filters.
- If an employee or worker requests that the employer provide protective clothing to be used by the employee or worker, the employer shall provide the employee or worker with protective clothing made of a material that does not readily retain nor permit the penetration of asbestos fibre and shall consist of a head covering, full body covering and suitable footwear; and the employee or worker shall wear the protective clothing.
- An employee or worker who is provided with protective clothing shall, before leaving the work area shall;
  - Decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing,
  - If the protective clothing will not be reused, place it in an asbestos waste container.
  - Facilities for the washing of hands and face shall be made available to employees or workers and shall be used by every employee or worker before leaving the work area.
- All activities shall be fully documented on the Work Permit.
- The Work Permit must be given to the Asbestos Program Manager for filing with the Management Plan.

4.9.2 Type 2 or Type 3 Operations

Any maintenance or renovation activity requiring a Type 2 or Type 3 Operation of ACM shall only be performed by specially trained maintenance personal under the direction of the Asbestos Program Manager or an outside asbestos abatement contractor approved by the Asbestos Program Manager.

4.10 Necessary Equipment and Supplies

Materials and equipment itemized in this section are considered essential for any SOP program where maintenance staff is trained to handle ACM. The Asbestos Program Manager shall have a clean, secure area where these items can be safely stored and be readily available. Each employee will have his or her own personal respirator.

The required equipment is as follows:

Danger Asbestos Signs – For maintenance rooms that contain ACM and for work areas
Danger Asbestos Signs – For attaching to ACM or Asbestos Free signs for attaching to non-ACM
Caution Tape – For roping off a work area
Respirators (individual, fit tested)

Coveralls (disposable, impervious to asbestos fibres)
Garden pump sprayer
Agent for amended water
3" wide duct tape
Utility knife with retractable blade
Roll of 6 mil polyethylene
Rags
6 mil polyethylene labeled yellow asbestos disposable bags
HEPA vacuum

4.11 ACM Surveillance and Re-inspection

The City shall perform a yearly surveillance of all friable ACM in the various facilities at a schedule to be determined by the Asbestos Program Manager. Buildings with non-friable ACM are to be inspected every three years. Field Survey Update Forms are presented in **Appendix F.**

4.12 Updating the Management Plan

Upon the completion of any remedial work, the Asbestos Program Manager shall enter updated information on the Building Survey Update form and file it as an addendum to the original Asbestos Site Survey.

Appendix A:
Terms and Definitions

Appendix A
Asbestos Glossary

Acoustical Insulation	The general application or use of sprayed asbestos material for sound attenuation.
Acoustical Tile	A finishing material in a building usually found in the ceiling or walls for the purpose of noise control.
Aggressive Sampling	Air sampling which takes place after final cleanup while the air is being physically agitated to produce a "worst case" situation.
Air Monitoring	The process of measuring the airborne fibre concentration in a specific quantity of air over a given amount of time.
Airborne Asbestos Analysis	Determination of the number of asbestos fibres present in a given volume of air.
Alveolar Macrophages	Highly specialized mobile cells in the lungs that attempt to engulf and digest such lung hazards as dusts or fibres.
Alveoli	Located in clusters around the respiratory brochides of the lungs, this is the area in which true respiration takes place.
Ambient Air	The surrounding air or atmosphere in a given area under normal conditions.
Amended Water	Water to which a chemical wetting agent (surfactant) has been added to improve penetration into asbestos-containing materials that are being removed.
Approved Landfill	A site approved by the MOE for the disposal of asbestos-containing materials and other wastes.
Asbestiform	Fibrous minerals which, due to their crystal structure and chemical composition, can be classified as a form of asbestos.
Asbestos	A generic name given to a number of naturally occurring hydrated mineral silicates that possess a unique crystalline structure, are incombustible in air, and are separable into fibres. Asbestos includes asbestiform varieties of chrysotile (serpentine); crocidolite (riebeckite); amosite (cummingtonite-grunerite); anthophyllite; and actinolite.

Asbestos Abatement	The removal of asbestos-containing materials from buildings.
Asbestos Fibres	Fibres generated from an asbestos-containing material and which have a length greater than five microns (length to width ratio of 3:1).
Asbestosis	A non-malignant, progressive, irreversible lung disease caused by the inhalation of asbestos dust and characterized by diffuse fibrosis.
Bridging Encapsulant	A sealant placed over the surface of asbestos-containing material to prevent the release of asbestos fibres.
Bronchi	Primary branches of the trachea (windpipe)
Cancer	A cellular tumor which normally leads to premature death of its host unless controlled.
Carbon Monoxide	A highly toxic colourless and odorless gas.
Cementitious	Asbestos-containing materials that are densely packed, granular, and friable.
Cfm	Cubic feet per minute
Chrysotile (white asbestos)	The only asbestiform mineral of the serpentine variety which contains approximately 40% each of silica and magnesium oxide. It is the most common form of asbestos used in buildings.
Cilia	Tiny hair-like structures in the windpipe and bronchi of the lung passages that help force undesirable particles and liquids up and out of the lungs.
Clean Area	The first stage of the decontamination enclosure system in which employees prepare to enter the work area.
Closed Circuit SCBA	A self-contained respiratory protection device in which the air is re-breathed after the exhaled carbon dioxide has been removed and the oxygen content restored.

Compressed Oxygen Cylinder Type Closed Circuit SCBA	A self-contained respiratory protection device in which air is supplied from a compressed air cylinder. The exhaled air is filtered to remove carbon dioxide, and additional breathing air is provided.
Containment	The isolation of the work area from the rest of the building to prevent the release of asbestos fibres into clean areas.
Contaminated Items	Any objects that have been exposed to airborne asbestos fibres.
Continuous Flow Airline Device	A respirator that maintains a constant airflow to the wearer.
Decontamination Enclosure System	A series of connected rooms with polyethylene curtained doorways for the purpose of preventing contamination of areas adjacent to the work area.
Delaminate	To delaminate refers to the separation of sprayed asbestos-containing material from the substrate or underlayer.
Dirty Area	Any area in which the concentration of airborne asbestos fibres exceeds 0.01 f/cc, or where there is visible asbestos residue.
Duct Tape	Heavy gauge tape capable of sealing joints or adjacent sheets of polyethylene.
Electron Microscopy	A method of asbestos sample analysis which utilizes an electron beam to differentiate between fibres.
Encapsulant	A substance applied to asbestos-containing material which controls the release of airborne asbestos fibres.
Encapsulation	The coating of asbestos-containing material with a bonding or sealing agent to prevent the release of airborne fibres.
Enclosure	Enclosure is the construction of an air-tight barrier over or around friable asbestos to contain fibres and prevent building contamination due to accidental damage to the asbestos material. Enclosure is an alternate abatement process.

EPA	Environmental Protection Agency (United States)
Equipment Room	The last stage or room of the worker decontamination system before entering the work area.
Eyepiece	A component of a full facepiece respirator which is a gas-tight transparent window through which the wearer may see.
f/cc	Fibres per cubic centimeters of air.
Facepiece	The portion of a respirator which covers the wearer's nose, mount, and eyes in a full facepiece.
FEV1	The maximum volume of air that can be forced from an individual's fully inflated lungs in one second (Forced Expiratory Volume – one second).
Fibre Containment	Enclosing or sealing off an area having airborne asbestos fibres present so that the fibres will not migrate resulting in contamination of other areas.
Fibre Control	Minimizing the amount of airborne fibre generation through the application or amended water onto asbestos-containing material, or enclosure (isolation) of the material.
Fibrosis	A condition of the lungs marked by the presence of scar tissue caused by the inhalation of excessive amounts of fibrous dust
Fibrous	Composed almost entirely of fibres.
Fibrous Aerosol Monitor (FAM)	A portable survey instrument with the capability of providing instantaneous airborne fibre concentration readings.
Fireproofing	Spray- or trowel-applied fire resistant materials.
Forced Vital Capacity (FVC)	The measured quantity of air that be forcibly exhaled from a person's lungs after full inhalation.

Friable Asbestos	Any materials that contain more than 1% asbestos by weight and can be crumbled, pulverized, or reduced to powder by hand pressure.
Full Facepiece Respirator	A respirator which covers the wearer's entire face from the hairline to below the chin.
Glovebag	Plastic bag-type enclosure placed around asbestos-containing pipe lagging so that it may be removed without generating airborne fibres into the atmosphere.
Grade D Air	Breathing air which has between 19.5% and 23% oxygen, no more than $5mg/m^3$ of condensed hydrocarbons, no more than 20 ppm of carbon monoxide, no pronounced odor, and a maximum of 1000 ppm carbon dioxide.
Ground Fault Circuit Breaker	A circuit breaker that is sensitive to very low levels of current leakage from a fault in an electrical system.
Ground Fault Circuit Interrupter	A device which automatically de-energizes any high voltage system component which has developed a fault in the ground line.
HEPA	High Efficency Pariculate Air (Filter)
HEPA Filtered Vacuum	A high efficiency particulate air (HEPA) filtered vacuum capable of trapping and retaining 99.97% of all particles larger than 0.3 microns.
High Mast/ High Efficiency	A respirator which covers one-half of the wearer's face and is equipped with filters capable of screening out 99.97% of all particles larger than 0.3 microns
Homogeneous	Evenly mixed and similar in appearance and texture throughout.
Hose Masks	Respirators that supply air from an uncontaminated source through a strong, large diameter hose to the facepiece that does not use compressed air or have any pressure-regulating devices.
HVAC System	Heating, Ventilation, and Air Conditioning system usually found in large business and industry facilities.

Industrial Hygienist	A professional qualified by education, training and experience to recognize, evaluate, and develop controls for occupational health hazards.
Local Exhaust Ventilation	The mechanical removal of air containments from a point of operation.
Logbook	An official record of all activities which occurred during a removal project.
Lung Cancer	An uncontrolled growth of abnormal cells in the lungs which normally results in the death of the host.
Make-up Air	Supplied or re-circulated air to offset that which has already been exhausted from an area.
Medical History	A record of a person's past health record, including all the hazardous materials that they have been exposed to, and any injuries or illnesses which might dictate their future health status.
Mesothelioma	A relatively rare form of cancer with no known cure which develops in the lining of the pleura or peritoneum.
Method 7400	NIOSH sampling and analytical method for fibres using phase-contrast microscopy.
Micron	One millionth of a meter.
Mil	One-thousandth
Millimeter	One-thousandth of a meter
MOL	Ministry of Labour
Mineral Wool	A commonly used substitute for asbestos.
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
Negative Pressure	An atmosphere created in a work area enclosure such that airborne fibres will tend to be drawn through the filtration system rather than leak out into the surrounding areas. The air pressure inside the work area is less than that outside the work area.

NIOSH	The National Institute for Occupational Safety and Health which was established by the Occupational Safety and Health Act of 1970 (United States)
NIOSH/MSHA	The official approving agencies for respirator protective equipment who test and certify respirators.
Oil-less Compressor	An air compressor that is not oil lubricated and therefore does not allow oil vapour or droplets to be formed in the breathing air.
Open Circuit SCBA	A type of self-contained breathing unit which exhausts the exhaled air to the atmosphere instead of re-circulating it.
Operations & Maintenance Program (OMP)	Specific procedures and practices developed for the interim control of asbestos-containing materials in buildings until it is removed.
OSHA	The Occupational Safety and Health Administration which was created by the Occupational Safety and Health Act of 1970; serves as the enforcement agency for safety and health in the workplace environment (United States).
Oxygen-deficient Atmosphere	Any atmosphere containing less than 19.5% oxygen.
P&CAM 239	A NIOSH sampling and analytical method for measuring airborne fibres using phase-contract microscopy.
Particulate Contaminants	Minute airborne particles given off in the form of dusts, smokes, fumes, or mists.
PEL	Permissible Exposure Limit as stated by OSHA.
Penetrating Encapsulant	Liquid material applied to asbestos-containing material to control airborne fibre release by penetrating into the material and binding components together.
Personal Protective Equipment (PPE)	Any material or device worn to protect a worker from exposure to, or contact with, any harmful material or force.

Personal Sample	An air sample taken with the sampling pump directly attached to the worker with the collecting filter placed in the worker's breathing zone.
Personnel Protection	Notification and instruction of all employees prior to the beginning of a project as to the hazards associated with the job and what they can do to protect themselves from these hazards.
PF	Protection Factor as provided by a respirator which is determined by dividing the airborne fibre concentration outside of the mask by the concentration inside the mask.
Phase Contrast Microscopy (PCM)	An optical microscopic technique used for the counting of fibres in air samples, but which does not distinguish fibre types.
Pneumoconiosis	A condition in the lungs which is a result of having inhaled various dusts and particles for a prolonged period of time.
Pipe Lagging	The insulation or wrapping around a pipe.
Pleura	The thin membrane surrounding the lungs, and which line the internal surface of the chest cavity.
Polarized Light Microscopy (PLM)	An optical microscopic technique used to distinguish between different types of asbestos fibres by their shape and unique optical properties.
Polyetheylene	Plastic sheeting which is often used to seal off an area in which asbestos removal is taking place for the purpose of preventing contamination of other areas.
Posting	Refers to caution or warning signs which should be posted in any area in which asbestos removal is taking place, or where airborne fibre levels may present a health hazard.
Powered Air Purifying Respirator (PARR)	Either a full facepiece, helmet, or hooded respirator that has the breathing air powered to the wearer after it has been purified through a filter.

Pressure Demand Airline Devices	A respiratory protection device which has a regulator and valve design such that there is a continuous flow of air into the facepiece at all times.
Prevalent Levels	Levels of airborne contaminants occurring under normal conditions.
Prevalent Samples	Air samples taken under normal conditions (background samples)
Protective Clothing	Protective, lightweight garments worn by employees performing asbestos abatement to keep gross contamination off the body.
Pulmonary Function Tests	A part of the medical examination required to determine the health status of a person's lungs.
Qualitative Fit Test	A method of testing a respirator which offers the most accurate, detailed information on respirator fit. It involves the introduction of a harmless aerosol to the wearer while he or she is in a test chamber. While the wearer performs exercises which could include facepiece is then measured for the presence of the harmless aerosol.
Rales	An abnormal sound heard from the lungs which does not necessarily indicate any specific disease.
Random Sample	A sample drawn in such a way that there is no set pattern and is designed to give a true representation of the entire population or area.
Record-keeping	Detailed documentation of all program activities, decisions, analyses, and any other pertinent information to a project.
Resolution	The ability to distinguish between individual objects, as with a microscope.
Respirable	Breathable
Respirator Program	A written program established by an employer which provides for the safe use of respirators on their job sites.
Risk	The likelihood or probability of developing a disease, or being hurt, as the result of exposure to a contaminant or a condition.

Safety Glasses	Protective eye equipment.
Scanning Electron Microscopy (SEM)	A method of microscope analysis which utilizes an electron beam directed at the sample and then collects the beams that are reflected to produce an image from which fibres can be identified and counted.
Scanning TransmissionElectron Microscopy (STEM)	A combination of a transmission electron microscope with scanning and focusing coils so that a beam of electrons can be scanned over the sample or pinpointed in a particular area.
SCBA	Self-contained Breathing Apparatus
Shower Room	A room between the clean room and the equipment room in a worker decontamination system in which employees take showers when leaving the work area.
Spirometer	An instrument which measures the volume of air being expired from the lungs.
Structural Member	Any load-supporting member such as beams and load supporting walls of a facility.
Substrate	The material or existing surface located under or behind the asbestos-containing material.
Supplied Air Respirator	A respirator that has a central source of breathing air which is supplied to the wearer by way of an airline.,
Sufactant	A chemical wetting agent added to water to improve its penetration abilities into asbestos-containing materials.
TLV	Levels of contaminants established by the Numerical Conference of Governmental Industrial Hygienists to which it is believed that employees can be exposed to with minimal adverse health effects (United States).
Transmission Electron Microscopy (TEM)	A method of microscopic analysis which utilizes an electron beam that is focused onto a thin sample. As the beam penetrates (transmits) through the sample, the

	difference in densities produces an image on a fluorescent screen from which samples can be identified and counted.
Treated Cellulose	An insulation material made of paper or wood products with fire-retarding treatment added.
TWA	Time-Weighted Average, as in air sampling
Type B Reader	A physician with specialized training in reading x-rays, specifically in recognizing lung disorders.
Type C Supplied-Air Respirator	A respirator designed to provide a very high level of protection which supplies air to the wearer from an outside source such as a compressor.
USEPA	United States Environmental Protection Agency.
Visible Emissions	Airborne fibres given off from an asbestos-containing source that are visible to the human eye.
Visual Inspection	A walk-through-type inspection of the work area to detect incStandard Operating Procedureslete work, damage, or inadequate clean up of a work site.
Water Damage	Deterioration of delamination of ceiling or wall materials due to leaks from plumbing or cracks in the roof.
Wet Cleaning	The process of eliminating asbestos contamination from surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water.
Wetting Agents	Materials that are added to water which is used for wetting the asbestos-containing material in order for the water to penetrate more effectively.

Non-friable Matrix Bonded Composite Products

Substance	Generic Name	Asbestos Percent	Dates of Use	Binder/Sizing
Cementitious products	Extrusion panels corrugated	8	1965-1977	Portland cement
	Flat	20-45	1930-197-	Portland cement
	Flexible	40-50	1930-197-	Portland cement
	Flexible	30-50	1930-197-	Portland cement
	Perforated laminated	30-50	1930-197-	Portland cement
	(outer surface) roof tiles	35-50	1930-197-	Portland cement
	Clapboard & shingles	30-20	1930-197-	Portland cement
	Clapboard	12-25	1944-1945	Portland cement
	Siding	12-14	Unknown-197-	Portland cement
	Shingles roofing	32-20	Unknown-197-	Portland cement
	Shingles pipe	20-15	1935-197-	Portland cement
Flooring, Tile and Sheet Goods	Vinyl/asbestos tile	21	1950-197-	Poly(vinyl)chloride
	Asphalt/asbestos tile	26-33	1920-197-	Asphalt
	Sheet good/resilient sheet	30	1950-197-	Dry oils
Wall covering	Vinyl wallpaper	6-8	Unknown-197-	---
Paints and Coatings	Roof coating	4-7	1900-197-	Asphalt
	Air tight	15	1940-197-	Asphalt
Paper products	Corrugated: high temperature	90	1935-197-	Sodium silicate
	Moderate temperature	70-35	1910-1971	Starch
	Indented	98	1935-197-	Cotton & organic binder
	Millboard	80-85	1925-197-	Starch, lime, clay
Roofing Felts	Smooth surface	10-15	1910-197-	Asphalt
	Mineral surface	10-15	1910-197-	Asphalt
	Shingles	1	1971-1974	Asphalt
	Pipeline	10	1920-197-	Asphalt
Asbestos-Containing Compounds	Caulking putties	30	1930-197-	Linseed oil
	Adhesive (cold applied) joint compound	5-25	1945-1975	Asphalt
	Roofing asphalt	5	Unknown-197-	Asphalt
	Mastics	5-25	1920-197-	Asphalt
	Asphalt tile cement	13-25	1959-197-	Asphalt
	Roof putty	10-25	Unknown-197-	Asphalt

	Plaster/stucco	2-10	Unknown-197-	Portland cement
	Spackles	3-5	1930-1975	Starch, casein synthetic resins
	Sealants fire/water	50-55	1935-197-	Caster oil or polyisobutylene
	Cement, insulation	20-100	1900-1973	Clay
	Cement, finishing	55	1920-1973	Clay
	Cement magnesia	15	1926-1950	Magnesium carbonate
Asbestos Ebony Products		50	1930-197-	Portland cement

Asbestos Friable Material and Textile Products

Substance	Generic Name	Asbestos Percent	Dates of Use	Binder/Sizing
Friable insulating material	Spray-applied insulation	1-95	1935-1970	Sodium silicate, Portland cement, organic binders
Preformed thermal Insulating Products	Kaylo (K-Lo)	15-20	1942-1971	Hydrous calcium silicate
	Batts, blocks, & pipe covering 85% magnesia	15	1926-1949	Magnesium carbonate
	Calcium silicate	6-8	1949-1971	Calcium silicate
Textiles	Cloth blankets	100	1910-1977-78	None
	Felts	90-95	1920-197-	Cotton/wool
	Blue stripe	80	1920-197-	Cotton
	Red strip	90	1920-197-	Cotton
	Green strip	95	1920-197-	Cotton
	Sheet	95-50	1920-197-	Cotton/wool
	Cord/rope/yarn	80-100	1920-197-	Cotton/wool
	Tubing	80-85	1920-197-	Cotton/wool
	Tape/strip	90	1920-197-	Cotton/wool
	Curtains (theatre,welding)	60-65	1945-197-	cotton

These lists have been largely derived from the Technical Report R883, Civil engineering Laboratory, Naval Construction Battalion Center, Port Hueneme, on “Management Procedure for Assessment of Friable Asbestos Insulating Material,” February 1981. A more detailed explanation of the subdivisions listed in the charts can be found in the above referenced document.

Appendix B:
Employee Asbestos Management Plan Review List

Appendix B
Employee & Manual List

I hereby acknowledge that I have reviewed a copy of the Manual titled "Asbestos Management Plan including Standard Operating Procedures, City of Guelph", on the date noted next to my signature. I further acknowledge that I shall abide by its contents.

Name	Date Signed Out	Date Returned

Appendix C:
Work Permit

APPENDIX C
WORK PERMIT

PERMIT APPLICATION FOR PERFORMING MAINTENANCE/RENOVATION WORK.

1. Exact location of area involved (including building name, building address, room number, location within room, etc.) _____
   _____
   _____

2. Starting Date _____ Anticipated completion Date _____

3. *Approximate amount of asbestos present (linear feet, square feet, size of tank, etc.)
   _____

4. *Asbestos control methods to be used (i.e., glovebag, HEPA vacuum, wet methods, etc.)
   _____
   _____

5. *Protective equipment to be used (respirator, coveralls, etc.)_____
   _____
   _____

6. Name and telephone number/extension of supervisor_____
   _____
   _____

TO BE FILLED OUT BY ASBESTOS PROGRAM MANAGER:

Permit _____ Accepted _____Rejected_____

Signed_____ Print_____

Permit Number_____

Emergency Contact_____

Please return this form to:

*** Note: These items may have to be filled out by Asbestos Program Manager.**

Appendix D:
Fibre Release Episode

APPENDIX D
FIBRE RELEASE EPISODE

FIBRE RELEASE EPISODE REPORT

1. Address, building, and room number(s) (or description of area) where episode occurred: _____
_____
_____
_____
_____
_____
_____

2. The release episode was reported by _____
on _____ (date).

3. Describe the episode: _____
_____
_____
_____
_____
_____
_____
_____
_____
_____

4. The asbestos-containing material was _____ / was not_____ cleaned up according to approved procedures. Describe the cleanup: _____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Signed: _____ Date: _____
(Asbestos Program Manager)

Appendix E:
Asbestos Survey Data

Appendix F:
Field Survey Update Forms

APPENDIX F
FIELD SURVEY UPDATE FORMS

FIELD SURVEY UPDATE FORM
REASSESSMNT OF ASBESTOS-CONTAINING MATERIALS

Location of asbestos-containing material(s) (address, building, room(s), or general description:
_____
_____
_____
_____
_____

Type of asbestos-containing material(s):

1. Sprayed- or trowelled-on ceilings or walls.
2. Sprayed- or trowelled-on structural members.
3. Insulation on pipes, tanks, or boilers.
4. Other (describe): _____
_____

Abatement Status:

1. The material has been encapsulated _____ enclosed_____, neither _____

Assessment:

1. Evidence of physical damage: _____
_____

2. Evidence of water damage: _____
_____

3. Evidence of delamination or other deterioration: _____
_____

4. Degree of accessibility of the material: _____
_____

5. Degree of activity near the material: _____
_____

6. Location in an air plenum, air shaft, or air stream: _____
_____

7. Other observations (including the condition of the encapsulant or enclosure, if any): _____
_____
_____

Signed: _____ Date: _____
Evaluator

Appendix G
Copy of O. Reg. 278/05

Definitions

1. (1) In this Regulation,

"asbestos" means any of the fibrous silicates listed in subsection (2);

"asbestos-containing material" means material that contains 0.5 per cent or more asbestos by dry weight;

"building" means any structure, vault, chamber or tunnel including, without limitation, the electrical, plumbing, heating and air handling equipment (including rigid duct work) of the structure, vault, chamber or tunnel;

"competent worker", in relation to specific work, means a worker who,

(a) is qualified because of knowledge, training and experience to perform the work,

(b) is familiar with the Act and with the provisions of the regulations that apply to the work, and

(c) has knowledge of all potential or actual danger to health or safety in the work;

"demolition" includes dismantling and breaking up;

"examine", when used with reference to material, means to carry out procedures in accordance with section 3 to establish its asbestos content and to establish the type of asbestos, and "examination" has a corresponding meaning;

"friable material" means material that,

(a) when dry, can be crumbled, pulverized or powdered by hand pressure, or

(b) is crumbled, pulverized or powdered;

"HEPA filter" means a high efficiency particulate aerosol filter that is at least 99.97 per cent efficient in collecting a 0.3 micrometre aerosol;

"homogeneous material" means material that is uniform in colour and texture;

"joint health and safety committee" means,

(a) a joint health and safety committee established under section 9 of the Act,

(b) a similar committee described in subsection 9 (4) of the Act, or

(c) the workers or their representatives who participate in an arrangement, program or system described in subsection 9 (4) of the Act;

"occupier" has the same meaning as in the *Occupiers' Liability Act*;

"Type 1 operation" means an operation described in subsection 12 (2);

"Type 2 operation" means an operation described in subsection 12 (3);

"Type 3 operation" means an operation described in subsection 12 (4). O. Reg. 278/05, s. 1 (1).

(2) The fibrous silicates referred to in the definition of "asbestos" in subsection (1) are:

1. Actinolite.
2. Amosite.
3. Anthophyllite.
4. Chrysotile.
5. Crocidolite.
6. Tremolite. O. Reg. 278/05, s. 1 (2).

Application

2. (1) This Regulation applies to,

(a) every project, its owner, and every constructor, employer and worker engaged in or on the project;

(b) the repair, alteration or maintenance of a building, the owner of the building, and every employer and worker engaged in the repair, alteration or maintenance;

(c) every building in which material that may be asbestos-containing material has been used, and the owner of the building;

(d) the demolition of machinery, equipment, aircraft, ships, locomotives, railway cars and vehicles, and every employer and worker engaged in the demolition; and

(e) subject to subsection (3),

(i) work described in subsection (2) in which asbestos-containing material is likely to be handled, dealt with, disturbed or removed, and

(ii) every employer and worker engaged in the work. O. Reg. 278/05, s. 2 (1).

(2) Clause (1) (e) applies to,

(a) the repair, alteration or maintenance of machinery, equipment, aircraft, ships, locomotives, railway cars and vehicles; and

(b) work on a building that is necessarily incidental to the repair, alteration or maintenance of machinery or equipment. O. Reg. 278/05, s. 2 (2).

(3) This Regulation does not apply to an employer to whom Regulation 837 of the Revised Regulations of Ontario, 1990 (Designated Substance — Asbestos) applies in respect of those workers employed by the employer and engaged in the activities described in clause (1) (e) if the employer has on or before December 16, 1985 put into effect and maintained measures and procedures to control the exposure of workers to asbestos and has incorporated the same in an asbestos control program in accordance with Regulation 837 of the Revised Regulations of Ontario, 1990. O. Reg. 278/05, s. 2 (3).

(4) This Regulation does not apply to an owner of a private residence occupied by the owner or the owner's family or to an owner of a residential building that contains not more than four dwelling units, one of which is occupied by the registered owner or family of the registered owner. O. Reg. 278/05, s. 2 (4).

Adoption of standard

3. (1) For the purposes of this Regulation, the method and procedures for establishing whether material is asbestos-containing material and for establishing its asbestos content and the type of asbestos shall be in accordance with the following standard:

1. U.S. Environmental Protection Agency. Test Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials. June 1993. O. Reg. 278/05, s. 3 (1).

(2) The procedures required by subsection (1) shall be carried out on bulk material samples that are randomly collected by a competent worker and are representative of each area of homogeneous material. O. Reg. 278/05, s. 3 (2).

(3) The minimum number of bulk material samples to be collected from an area of homogeneous material is set out in Table 1. O. Reg. 278/05, s. 3 (3).

(4) If analysis establishes that a bulk material sample contains 0.5 per cent or more asbestos by dry weight,

(a) it is not necessary to analyze other bulk material samples taken from the same area of homogeneous material; and

(b) the entire area of homogeneous material from which the bulk material sample was taken is deemed to be asbestos-containing material. O. Reg. 278/05, s. 3 (4).

Restrictions re sprayed material, insulation, sealants

4. (1) No person shall apply or install or cause to be applied or installed, by spraying, material containing 0.1 per cent or more asbestos by dry weight that can become friable. O. Reg. 278/05, s. 4 (1).

(2) No person shall apply or install or cause to be applied or installed, as thermal insulation, material containing 0.1 per cent or more asbestos by dry weight that can become friable. O. Reg. 278/05, s. 4 (2).

(3) A liquid sealant shall not be applied to friable asbestos-containing material if,

(a) the material has visibly deteriorated; or

(b) the material's strength and its adhesion to the underlying materials and surfaces are insufficient to support its weight and the weight of the sealant. O. Reg. 278/05, s. 4 (3).

Information for workers

5. (1) This section applies whenever a worker is to do work that,

(a) involves material that,

(i) is asbestos-containing material,

(ii) is being treated as if it were asbestos-containing material,

(iii) is the subject of advice under section 9 or a notice under subsection 10 (8); or

(b) is to be carried on in close proximity to material described in clause (a) and may disturb it. O. Reg. 278/05, s. 5 (1).

(2) The constructor or employer shall advise the worker and provide him or her with the following information:

1. The location of all material described in clause (1) (a).

2. For each location, whether the material is friable or non-friable.

3. In the case of sprayed-on friable material, for each location,

i. if the material is known to be asbestos-containing material, the type of asbestos, if known, or

ii. in any other case, a statement that the material will be treated as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 5 (2).

Demolition

6. (1) The demolition of all or part of machinery, equipment, a building, aircraft, locomotive, railway car, vehicle or ship shall be carried out or continued only when any asbestos-containing material that may be disturbed during the work has been removed to the extent practicable. O. Reg. 278/05, s. 6 (1).

(2) Subsection (1) does not apply so as to prevent work necessary to gain access to the asbestos-containing material that is to be removed, if the workers doing the work are protected from the hazard. O. Reg. 278/05, s. 6 (2).

Ongoing asbestos management in buildings, two-year transitional period

7. (1) This section does not apply on or after November 1, 2007. O. Reg. 278/05, s. 7 (1).

(2) Subsection (3) applies if,

(a) the owner of a building treats friable material that has been used in the building for any purpose related to it, including insulation and fireproofing, as if it were asbestos-containing material;

(b) the owner of a building has been advised under section 9 of the discovery of friable material that may be asbestos-containing material;

(c) the owner of a building knows or ought reasonably to know that friable asbestos-containing material has been used in a building for any purpose related to the building, including insulation, and fireproofing;

(d) an examination under subsection (8) or section 10 establishes, or would have established if carried out as required, that friable asbestos-containing material has been used in a building for any purpose related to the building, including insulation and fireproofing; or

(e) a constructor or employer notifies the owner of a building, in accordance with subsection 10 (8), of the discovery of friable material that may be asbestos-containing material and that was not referred to in a report prepared under subsection 10 (4). O. Reg. 278/05, s. 7 (2).

(3) If this subsection applies, the owner shall,

(a) prepare and keep on the premises a record containing the information set out in subsection (4);

(b) give any other person who is an occupier of the building written notice of any information in the record that relates to the area occupied by the person;

(c) give any employer with whom the owner arranges or contracts for work that is not described in clause 10 (1) (a) written notice of the information in the record, if the work,

(i) may involve material mentioned in the record, or

(ii) may be carried on in close proximity to such material and may disturb it;

(d) advise the workers employed by the owner who work in the building of the information in the record, if the workers may do work that,

(i) involves material mentioned in the record, or

(ii) is to be carried on in close proximity to such material and may disturb it;

(e) establish and maintain, for the training and instruction of every worker employed by the owner who works in the building and may do work described in clause (d), a program dealing with,

(i) the hazards of asbestos exposure,

(ii) the use, care and disposal of protective equipment and clothing to be used and worn when doing the work,

(iii) personal hygiene to be observed when doing the work, and

(iv) the measures and procedures prescribed by this Regulation; and

(f) inspect the material mentioned in the record at reasonable intervals in order to determine its condition. O. Reg. 278/05, s. 7 (3).

(4) The record shall contain the following information:

1. The location of all material described in clauses (2) (a), (b), (c), (d) and (e).

2. In the case of sprayed-on material, for each location,

i. if the material is known to be asbestos-containing material, the type of asbestos, if known, or

ii. in any other case, a statement that the material will be treated as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 7 (4).

(5) The owner shall update the record described in clause (3) (a),

(a) at least once in each 12-month period; and

(b) whenever the owner becomes aware of new information relating to the matters the record deals with. O. Reg. 278/05, s. 7 (5).

(6) If updating under subsection (5) results in any change to the record, clauses (3) (b), (c) and (d) apply with necessary modifications. O. Reg. 278/05, s. 7 (6).

(7) An occupier who receives a notice under clause (3) (b) is responsible for performing the duties set out in clauses (3) (d) and (e) with respect to the occupier's own workers. O. Reg. 278/05, s. 7 (7).

(8) If it is readily apparent that friable material used in a building as fireproofing or acoustical or thermal insulation has fallen and is being disturbed so that exposure to the material is likely to occur,

(a) the owner shall cause the material to be examined to establish whether it is asbestos-containing material; and

(b) until it has been established whether the material is asbestos-containing material, no further work involving the material shall be done. O. Reg. 278/05, s. 7 (8).

(9) Subsection (8) does not apply if the work is carried out in accordance with this Regulation as though the material were asbestos-containing material and,

in the case of sprayed-on material, as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 7 (9).

(10) If the examination mentioned in subsection (8) establishes that the material is asbestos-containing material, or if the material is treated as though it were asbestos-containing material as described in subsection (9),

(a) the owner shall cause the fallen material to be cleaned up and removed; and

(b) if it is readily apparent that material will continue to fall because of the deterioration of the fireproofing or insulation, the owner shall repair, seal, remove or permanently enclose the fireproofing or insulation. O. Reg. 278/05, s. 7 (10).

(11) Subsection (10) does not apply if the fallen material is confined to an area that is,

(a) above a closed false ceiling; and

(b) not part of a return air plenum. O. Reg. 278/05, s. 7 (11).

Ongoing asbestos management in buildings after transitional period

8. (1) This section applies on and after November 1, 2007. O. Reg. 278/05, s. 8 (1).

(2) Subsection (3) applies if,

(a) the owner of a building treats material that has been used in the building for any purpose related to it, including insulation, fireproofing and ceiling tiles, as if it were asbestos-containing material;

(b) the owner of a building has been advised under section 9 of the discovery of material that may be asbestos-containing material;

(c) the owner of a building knows or ought reasonably to know that asbestos-containing material has been used in a building for any purpose related to the building, including insulation, fireproofing and ceiling tiles;

(d) an examination under subsection (8) or section 10 establishes, or would have established if carried out as required, that asbestos-containing material has been used in a building for any purpose related to the building, including insulation, fireproofing and ceiling tiles; or

(e) a constructor or employer advises the owner of a building, in accordance with subsection 10 (8), of the discovery of material that may be asbestos-containing material and that was not referred to in a report prepared under subsection 10 (4). O. Reg. 278/05, s. 8 (2).

(3) If this subsection applies, the owner shall,

(a) prepare and keep on the premises a record containing the information set out in subsection (4);

(b) give any other person who is an occupier of the building written notice of any information in the record that relates to the area occupied by the person;

(c) give any employer with whom the owner arranges or contracts for work that is not described in clause 10 (1) (a) written notice of the information in the record, if the work,

(i) may involve material mentioned in the record, or

(ii) may be carried on in close proximity to such material and may disturb it;

(d) advise the workers employed by the owner who work in the building of the information in the record, if the workers may do work that,

(i) involves material mentioned in the record, or

(ii) is to be carried on in close proximity to such material and may disturb it;

(e) establish and maintain, for the training and instruction of every worker employed by the owner who works in the building and may do work described in clause (d), a program dealing with,

(i) the hazards of asbestos exposure,

(ii) the use, care and disposal of protective equipment and clothing to be used and worn when doing the work,

(iii) personal hygiene to be observed when doing the work, and

(iv) the measures and procedures prescribed by this Regulation; and

(f) inspect the material mentioned in the record at reasonable intervals in order to determine its condition. O. Reg. 278/05, s. 8 (3).

(4) The record shall contain the following information:

1. The location of all material described in clauses (2) (a), (b), (c), (d) and (e).

2. For each location, whether the material is friable or non-friable.

3. In the case of friable sprayed-on material, for each location,

i. if the material is known to be asbestos-containing material, the type of asbestos, if known, or

ii. in any other case, a statement that the material will be treated as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 8 (4).

(5) The owner shall update the record described in clause (3) (a),

(a) at least once in each 12-month period; and

(b) whenever the owner becomes aware of new information relating to the matters the record deals with. O. Reg. 278/05, s. 8 (5).

(6) If updating under subsection (5) results in any change to the record, clauses (3) (b), (c) and (d) apply with necessary modifications. O. Reg. 278/05, s. 8 (6).

(7) An occupier who receives a notice under clause (3) (b) is responsible for performing the duties set out in clauses (3) (d) and (e) with respect to the occupier's own workers. O. Reg. 278/05, s. 8 (7).

(8) If it is readily apparent that friable material used in a building as fireproofing or acoustical or thermal insulation has fallen and is being disturbed so that exposure to the material is likely to occur,

(a) the owner shall cause the material to be examined to establish whether it is asbestos-containing material; and

(b) until it has been established whether the material is asbestos-containing material, no further work involving the material shall be done. O. Reg. 278/05, s. 8 (8).

(9) Subsection (8) does not apply if the work is carried out in accordance with this Regulation as though the material were asbestos-containing material and, in the case of friable sprayed-on material, as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 8 (9).

(10) If the examination mentioned in subsection (8) establishes that the material is asbestos-containing material, or if the material is treated as though it were asbestos-containing material as described in subsection (9),

(a) the owner shall cause the fallen material to be cleaned up and removed; and

(b) if it is readily apparent that material will continue to fall because of the deterioration of the fireproofing or insulation, the owner shall repair, seal, remove or permanently enclose the fireproofing or insulation. O. Reg. 278/05, s. 8 (10).

(11) Subsection (10) does not apply if the fallen material is confined to an area that is,

(a) above a closed false ceiling; and

(b) not part of a return air plenum. O. Reg. 278/05, s. 8 (11).

Responsibility of employer other than owner

9. An employer whose workers work in a building of which the employer is not the owner shall advise the owner if the workers discover material that may be asbestos-containing material in the building. O. Reg. 278/05, s. 9.

Owner's responsibilities before requesting tender or arranging work

10. (1) An owner shall comply with subsections (2), (3), (4), (5) and (6) before,

(a) requesting tenders for the demolition, alteration or repair of all or part of machinery, equipment, or a building, aircraft, locomotive, railway car, vehicle or ship; or

(b) arranging or contracting for any work described in clause (a), if no tenders are requested. O. Reg. 278/05, s. 10 (1).

(2) Unless clause (3) (a) or (b) applies, the owner shall have an examination carried out in accordance with section 3 to establish whether any material that is likely to be handled, dealt with, disturbed or removed, whether friable or non-friable, is asbestos-containing material. O. Reg. 278/05, s. 10 (2).

(3) An examination under subsection (2) is not required if,

(a) the owner,

(i) already knows that the material is not asbestos-containing material, or

(ii) already knows that the material is asbestos-containing material and, in the case of sprayed-on friable material, knows the type of asbestos; or

(b) the work is being arranged or contracted for in accordance with this Regulation as though the material were asbestos-containing material and, in the case of sprayed-on friable material, as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 10 (3).

(4) Whether an examination is required under subsection (2) or not, the owner shall have a report prepared,

(a) stating whether,

(i) the material is or is not asbestos-containing material, or

(ii) the work is to be performed in accordance with this Regulation as though the material were asbestos-containing material and, in the case of sprayed-on friable material, as though it contained a type of asbestos other than chrysotile;

(b) describing the condition of the material and stating whether it is friable or non-friable; and

(c) containing drawings, plans and specifications, as appropriate, to show the location of the material identified under clause (a). O. Reg. 278/05, s. 10 (4).

(5) An owner shall give any prospective constructor a copy of the complete report prepared under subsection (4). O. Reg. 278/05, s. 10 (5).

(6) Subsection (5) applies, with necessary modifications, with respect to,

(a) a constructor and a prospective contractor; and

(b) a contractor and a prospective subcontractor. O. Reg. 278/05, s. 10 (6).

(7) Subsections (8), (9) and (10) apply if, during work described in clause (1) (a), material is discovered that,

(a) was not referred to in the report prepared under subsection (4); and

(b) may be asbestos-containing material. O. Reg. 278/05, s. 10 (7).

(8) The constructor or employer shall immediately notify, orally and in writing,

(a) an inspector at the office of the Ministry of Labour nearest the workplace;

(b) the owner;

(c) the contractor; and

(d) the joint health and safety committee or the health and safety representative, if any, for the workplace. O. Reg. 278/05, s. 10 (8).

(9) The written notice referred to in subsection (8) shall include the information referred to in clauses 11 (3) (a) to (f). O. Reg. 278/05, s. 10 (9).

(10) No work that is likely to involve handling, dealing with, disturbing or removing the material referred to in subsection (7) shall be done unless,

(a) it has been determined under section 3 whether the material is asbestos-containing material; or

(b) the work is performed in accordance with this Regulation as though the material were asbestos-containing material and, in the case of sprayed-on friable material, as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 10 (10).

(11) Subsection (10) does not prohibit handling, dealing with, disturbing or removing material for the sole purpose of determining whether it is asbestos-containing material. O. Reg. 278/05, s. 10 (11).

Advance notice re Type 3 operations and certain Type 2 operations

11. (1) Before commencing a Type 3 operation, the constructor, in the case of a project, and the employer, in any other case, shall notify, orally and in writing, an inspector at the office of the Ministry of Labour nearest the workplace of the operation. O. Reg. 278/05, s. 11 (1).

(2) Subsection (1) also applies with respect to a Type 2 operation described in paragraph 9 of subsection 12 (3) in which one square metre or more of insulation is to be removed. O. Reg. 278/05, s. 11 (2).

(3) The written notice required by subsection (1) shall set out,

(a) the name and address of the person giving the notice;

(b) the name and address of the owner of the place where the work will be carried out;

(c) the municipal address or other description of the place where the work will be carried out sufficient to permit the inspector to locate the place, including the location with respect to the nearest public highway;

(d) a description of the work that will be carried out;

(e) the starting date and expected duration of the work; and

(f) the name and address of the supervisor in charge of the work. O. Reg. 278/05, s. 11 (3).

Type 1, Type 2 and Type 3 operations

12. (1) For the purposes of this Regulation, operations that may expose a worker to asbestos are classified as Type 1, Type 2 and Type 3 operations. O. Reg. 278/05, s. 12 (1).

(2) The following are Type 1 operations:

1. Installing or removing ceiling tiles that are asbestos-containing material, 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.

2. Installing or removing non-friable asbestos-containing material, other than ceiling tiles, if the material is installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.

3. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if,

   i. the material is wetted to control the spread of dust or fibres, and

   ii. the work is done only by means of non-powered hand-held tools.

4. Removing less than one square metre of drywall in which joint-filling compounds that are asbestos-containing material have been used. O. Reg. 278/05, s. 12 (2).

(3) The following are Type 2 operations:

1. Removing all or part of a false ceiling to obtain access to a work area, if asbestos-containing material is likely to be lying on the surface of the false ceiling.

2. The removal or disturbance of one square metre or less of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of machinery or equipment or a building, aircraft, locomotive, railway car, vehicle or ship.

3. Enclosing friable asbestos-containing material.

4. Applying tape or a sealant or other covering to pipe or boiler insulation that is asbestos-containing material.

5. Installing or removing ceiling tiles that are asbestos-containing material, 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.

6. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if,

   i. the material is not wetted to control the spread of dust or fibres, and

   ii. the work is done only by means of non-powered hand-held tools.

7. Removing one square metre or more of drywall in which joint filling compounds that are asbestos-containing material have been used.

8. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.

9. Removing insulation that is asbestos-containing material from a pipe, duct or similar structure using a glove bag.

10. Cleaning or removing filters used in air handling equipment in a building that has sprayed fireproofing that is asbestos-containing material.

11. An operation that,

   i. is not mentioned in any of paragraphs 1 to 10,

   ii. may expose a worker to asbestos, and

iii. is not classified as a Type 1 or Type 3 operation. O. Reg. 278/05, s. 12 (3).

(4) The following are Type 3 operations:

1. The removal or disturbance of more than one square metre of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of a building, aircraft, ship, locomotive, railway car or vehicle or any machinery or equipment.

2. The spray application of a sealant to friable asbestos-containing material.

3. Cleaning or removing air handling equipment, including rigid ducting but not including filters, in a building that has sprayed fireproofing that is asbestos-containing material.

4. 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 asbestos-containing materials.

5. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material, if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.

6. Repairing, altering or demolishing all or part of any building in which asbestos is or was used in the manufacture of products, unless the asbestos was cleaned up and removed before March 16, 1986. O. Reg. 278/05, s. 12 (4).

(5) Work on ceiling tiles, drywall or friable asbestos-containing material is classified according to the total area on which work is done consecutively in a room or enclosed area, even if the work is divided into smaller jobs. O. Reg. 278/05, s. 12 (5).

(6) The following provisions apply if a dispute arises as to the classification of an operation under this section:

1. A party to the dispute may notify an inspector at the office of the Ministry of Labour nearest the workplace of the dispute.

2. The party who notifies the inspector shall promptly inform the other parties that the inspector has been notified.

3. Work on the operation shall cease until the inspector has given a decision under paragraph 4.

4. The inspector shall, as soon as possible, investigate the matter and give the parties a decision in writing. O. Reg. 278/05, s. 12 (6).

(7) Nothing in subsection (6) affects an inspector's power to issue an order for a contravention of this Regulation. O. Reg. 278/05, s. 12 (7).

Respirators

13. (1) A respirator provided by an employer and used by a worker in a Type 1, Type 2 or Type 3 operation,

(a) shall be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet;

(b) shall be assigned to a worker for his or her exclusive use, if practicable;

(c) shall be used and maintained in accordance with written procedures that are established by the employer and are consistent with the manufacturer's specifications;

(d) shall be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker;

(e) shall have damaged or deteriorated parts replaced prior to being used by a worker; and

(f) when not in use, shall be stored in a convenient, clean and sanitary location. O. Reg. 278/05, s. 13 (1).

(2) The following additional requirements apply to a respirator of the supplied air type:

1. The compressed air used for breathing shall meet the standards set out in Table 1 of CSA Standard Z180.1-00, Compressed Breathing Air and Systems (March, 2000).

2. If an oil-lubricated compressor is used to supply breathing air, a continuous carbon monoxide monitor equipped with an alarm shall be provided.

3. If an ambient breathing air system is used, the air intake shall be located in accordance with Appendix B of the standard referred to in paragraph 1. O. Reg. 278/05, s. 13 (2).

(3) If respirators are used in the workplace,

(a) the employer shall establish written procedures regarding the selection, use and care of respirators; and

(b) a copy of the procedures shall be provided to and reviewed with each worker who is required to wear a respirator. O. Reg. 278/05, s. 13 (3).

(4) A worker shall not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator. O. Reg. 278/05, s. 13 (4).

Measures and procedures, Type 1 operations

14. The following measures and procedures apply to Type 1 operations:

1. Before beginning work, visible dust shall be removed with a damp cloth or a vacuum equipped with a HEPA filter from any surface in the work area, including the thing to be worked on, if the dust on that surface is likely to be disturbed.
2. The spread of dust from the work area shall be controlled by measures appropriate to the work to be done including the use of drop sheets of polyethylene or other suitable material that is impervious to asbestos.
3. In the case of an operation mentioned in paragraph 4 of subsection 12 (2), the material shall be wetted before and kept wet during the work to control the spread of dust or fibres, unless wetting would create a hazard or cause damage.
4. A wetting agent shall be added to water that is to be used to control the spread of dust and fibres.
5. Frequently and at regular intervals during the doing of the work and immediately on completion of the work,
    i. dust and waste shall be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a container as described in paragraph 5 of section 15, and
    ii. drop sheets shall be wetted and placed in a container as described in paragraph 5 of section 15, as soon as practicable after subparagraph i has been complied with.
6. Drop sheets shall not be reused.
7. After the work is completed, polyethylene sheeting and similar materials used for barriers and enclosures shall not be reused, but shall be wetted and placed in a container as described in paragraph 5 of section 15 as soon as practicable after paragraph 5 of this section has been complied with.
8. After the work is completed, barriers and portable enclosures that will be reused shall be cleaned, by using a vacuum equipped with a HEPA filter or by damp wiping, as soon as practicable after paragraphs 5 and 7 have been complied with.

9. Barriers and portable enclosures shall not be reused unless they are rigid and can be cleaned thoroughly.

10. Compressed air shall not be used to clean up and remove dust from any surface.

11. Eating, drinking, chewing or smoking shall not be permitted in the work area.

12. If a worker requests that the employer provide a respirator to be used by the worker, the employer shall provide the worker with a NIOSH approved respirator in accordance with Table 2, and the worker shall wear and use the respirator.

13. If a worker requests that the employer provide protective clothing to be used by the worker, the employer shall provide the worker with protective clothing as described in paragraph 12 of section 15, and the worker shall wear the protective clothing.

14. A worker who is provided with protective clothing shall, before leaving the work area,

    i. decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing,

    ii. if the protective clothing will not be reused, place it in a container as described in paragraph 5 of section 15.

15. Facilities for the washing of hands and face shall be made available to workers and shall be used by every worker when leaving the work area. O. Reg. 278/05, s. 14.

Measures and procedures, Type 2 and Type 3 operations

15. The following measures and procedures apply to Type 2 operations and to Type 3 operations:

1. The work area shall be identified by clearly visible signs warning of an asbestos dust hazard.

2. Signs required by paragraph 1 shall be posted in sufficient numbers to warn of the hazard and shall state in large clearly visible letters that,

    i. there is an asbestos dust hazard, and

    ii. access to the work area is restricted to persons wearing protective clothing and equipment.

3. A wetting agent shall be added to water that is to be used to control the spread of dust and fibres.

4. Eating, drinking, chewing or smoking shall not be permitted in the work area.

5. Containers for dust and waste shall be,

    i. dust tight,

    ii. suitable for the type of waste,

    iii. impervious to asbestos,

    iv. identified as asbestos waste,

    v. cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before being removed from the work area, and

    vi. removed from the workplace frequently and at regular intervals.

6. Frequently and at regular intervals during the doing of the work and immediately on completion of the work,

    i. dust and waste shall be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a container as described in paragraph 5, and

    ii. drop sheets shall be wetted and placed in a container as described in paragraph 5, as soon as practicable after subparagraph i has been complied with.

7. Drop sheets shall not be reused.

8. After the work is completed, polyethylene sheeting and similar materials used for barriers and enclosures shall not be reused, but shall be wetted and placed in a container as described in paragraph 5 as soon as practicable after paragraph 6 has been complied with.

9. After the work is completed, barriers and portable enclosures that will be reused shall be cleaned, by using a vacuum equipped with a HEPA filter or by damp wiping, as soon as practicable after paragraphs 6 and 8 have been complied with.

10. Barriers and portable enclosures shall not be reused unless they are rigid and can be cleaned thoroughly.

11. The employer shall provide every worker who will enter the work area with a NIOSH approved respirator in accordance with Table 2 and the worker shall wear and use the respirator.

12. Protective clothing shall be provided by the employer and worn by every worker who enters the work area, and the protective clothing,

i. shall be made of a material that does not readily retain nor permit penetration of asbestos fibres,

ii. shall consist of head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing,

iii. shall include suitable footwear, and

iv. shall be repaired or replaced if torn.

13. Compressed air shall not be used to clean up and remove dust from any surface.

14. Only persons wearing protective clothing and equipment shall enter a work area where there is an asbestos dust hazard. O. Reg. 278/05, s. 15.

Additional measures and procedures, Type 2 operations

16. In addition to the measures and procedures prescribed by section 15, the following measures and procedures apply to Type 2 operations:

1. If the operation is one mentioned in paragraph 1 of subsection 12 (3), the friable material that is likely to be disturbed shall be cleaned up and removed by using a vacuum equipped with a HEPA filter when access to the work area is obtained.

2. Before commencing work that is likely to disturb friable asbestos-containing material that is crumbled, pulverized or powdered and that is lying on any surface, the friable material shall be cleaned up and removed by damp wiping or by using a vacuum equipped with a HEPA filter.

3. Friable asbestos-containing material that is not crumbled, pulverized or powdered and that may be disturbed or removed during the work shall be thoroughly wetted before the work and kept wet during the work, unless wetting would create a hazard or cause damage.

4. Subject to paragraph 5, the spread of dust from a work area shall be controlled by measures appropriate to the work to be done, including the use of drop sheets of polyethylene or other suitable material that is impervious to asbestos.

5. If the operation is one mentioned in paragraph 1 or 2 of subsection 12 (3) and is carried on indoors, the spread of dust from the work area shall be prevented, if practicable, by,

i. using an enclosure of polyethylene or other suitable material that is impervious to asbestos (including, if the enclosure is opaque, one or more transparent window areas to allow observation of the

entire work area from outside the enclosure), if the work area is not enclosed by walls,

ii. disabling the mechanical ventilation system serving the work area, and

iii. sealing the ventilation ducts to and from the work area.

6. Before leaving the work area, a worker shall,

i. decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, and

ii. if the protective clothing will not be reused, place it in a container as described in paragraph 5 of section 15.

7. Facilities for the washing of hands and face shall be made available to workers and shall be used by every worker when leaving the work area. O. Reg. 278/05, s. 16.

Additional measures and procedures, glove bag operations

17. In addition to the measures and procedures prescribed by sections 15 and 16, the following measures and procedures apply to Type 2 operations referred to in paragraph 9 of subsection 12 (3):

1. The work area shall be separated from the rest of the workplace by walls, barricades, fencing or other suitable means.

2. The spread of asbestos-containing material from the work area shall be prevented by disabling the mechanical ventilation system serving the work area and sealing all openings or voids, including ventilation ducts to and from the working area.

3. Surfaces below the work area shall be covered with drop sheets of polyethylene or other suitable material that is impervious to asbestos.

4. The glove bag shall be made of material that is impervious to asbestos and sufficiently strong to support the weight of material the bag will hold.

5. The glove bag shall be equipped with,

i. sleeves and gloves that are permanently sealed to the body of the bag to allow the worker to access and deal with the insulation and maintain a sealed enclosure throughout the work period,

ii. valves or openings to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure,

iii. a tool pouch with a drain,

iv. a seamless bottom and a means of sealing off the lower portion of the bag, and

v. a high strength double throw zipper and removable straps, if the bag is to be moved during the removal operation.

6. A glove bag shall not be used to remove insulation from a pipe, duct or similar structure if,

i. it may not be possible to maintain a proper seal for any reason including, without limitation,

A. the condition of the insulation, or

B. the temperature of the pipe, duct or similar structure, or

ii. the bag could become damaged for any reason including, without limitation,

A. the type of jacketing, or

B. the temperature of the pipe, duct or similar structure.

7. Immediately before the glove bag is attached, the insulation jacketing or coating shall be inspected for damage or defects, and if any damage or defect is present, it shall be repaired.

8. The glove bag shall be inspected for damage or defects,

i. immediately before it is attached to the pipe, duct or other similar structure, and

ii. at regular intervals during its use.

9. If damage or defects are observed when the glove bag is inspected under subparagraph 8 i, the glove bag shall not be used and shall be disposed of.

10. If damage or defects are observed when the glove bag is inspected under subparagraph 8 ii or at any other time,

i. the use of the glove bag shall be discontinued,

ii. the inner surface of the glove bag and the contents, if any, shall be thoroughly wetted,

iii. the glove bag and the contents, if any, shall be removed and placed in a container as described in paragraph 5 of section 15, and

iv. the work area shall be cleaned by vacuuming with a vacuum equipped with a HEPA filter before removal work is resumed.

11. When the removal work is completed,

i. the inner surface of the glove bag and the waste inside shall be thoroughly wetted and the air inside the bag shall be removed through an elasticized valve, by means of a vacuum equipped with a HEPA filter,

ii. the pipe, duct or similar structure shall be wiped down and sealed with a suitable encapsulant,

iii. the glove bag, with the waste inside, shall be placed in a container as described in paragraph 5 of section 15, and

iv. the work area shall be cleaned by damp wiping or by cleaning with a vacuum equipped with a HEPA filter. O. Reg. 278/05, s. 17.

Additional measures and procedures, Type 3 operations

18. (1) In addition to the measures and procedures prescribed by section 15, the following measures and procedures apply to Type 3 operations:

1. The work area shall be separated from the rest of the workplace by walls, the placing of barricades or fencing or other suitable means.

2. Subsection (2) applies to an operation mentioned in paragraph 5 of subsection 12 (4).

3. Subsection (3) applies to an operation mentioned in paragraph 1, 2, 3 or 4 of subsection 12 (4) that is carried on outdoors.

4. Subsection (4) applies to an operation mentioned in paragraph 1, 2, 3, 4 or 6 of subsection 12 (4) that is carried on indoors. O. Reg. 278/05, s. 18 (1).

(2) In the case of an operation mentioned in paragraph 5 of subsection 12 (4), the following measures and procedures also apply:

1. The spread of dust from the work area shall be prevented by,

i. using enclosures of polyethylene or other suitable material that is impervious to asbestos (including, if the enclosure material is opaque, one or more transparent window areas to allow observation of the entire work area from outside the enclosure), if the work area is not enclosed by walls, and

ii. using curtains of polyethylene sheeting or other suitable material that is impervious to asbestos, fitted on each side of each entrance or exit from the work area.

2. Unless the operation is carried on outdoors, or inside a building that is to be demolished and will not be entered by any person except the workers involved in the operation and the workers involved in the demolition, the spread of dust from the work area shall also be prevented by,

i. creating and maintaining within the enclosed area, by installing a ventilation system equipped with a HEPA filtered exhaust unit, a negative air pressure of 0.02 inches of water, relative to the area outside the enclosed area,

ii. ensuring that replacement air is taken from outside the enclosed area and is free from contamination with any hazardous dust, vapour, smoke, fume, mist or gas, and

iii. using a device, at regular intervals, to measure the difference in air pressure between the enclosed area and the area outside it.

3. The ventilation system referred to in subparagraph 2 i shall be inspected and maintained by a competent worker before each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it shall be replaced before the ventilation system is used.

4. Before leaving the work area, a worker shall,

i. decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, and

ii. if the protective clothing will not be reused, place it in a container as described in paragraph 5 of section 15.

5. Facilities for the washing of hands and face shall be made available to workers and shall be used by every worker when leaving the work area. O. Reg. 278/05, s. 18 (2).

(3) In the case of an operation mentioned in paragraph 1, 2, 3 or 4 of subsection 12 (4) that is carried on outdoors, the following measures and procedures also apply:

1. If practicable, any asbestos-containing material to be removed shall be thoroughly wetted before and during removal, unless wetting would create a hazard or cause damage.

2. Dust and waste shall not be permitted to fall freely from one work level to another.

3. If practicable, the work area shall be washed down with water after completion of the clean-up and removal described in paragraph 6 of section 15.

4. Temporary electrical power distribution systems for tools and equipment involved in wet removal operations shall be equipped with ground fault circuit interrupters.

5. A decontamination facility shall be located as close as practicable to the work area and shall consist of,

i. a room suitable for changing into protective clothing and for storing contaminated protective clothing and equipment,

ii. a shower room as described in paragraph 7 of subsection (4), and

iii. a room suitable for changing into street clothes and for storing clean clothing and equipment.

6. The rooms described in subparagraphs 5 i, ii and iii shall be arranged in sequence and constructed so that any person entering or leaving the work area must pass through each room.

7. When leaving the work area, a worker shall enter the decontamination facility and shall, in the following order,

i. decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing,

ii. if the protective clothing will not be reused, place it in a container as described in paragraph 5 of section 15,

iii. shower, and

iv. remove and clean the respirator. O. Reg. 278/05, s. 18 (3).

(4) In the case of an operation mentioned in paragraph 1, 2, 3, 4 or 6 of subsection 12 (4) that is carried on indoors, the following measures and procedures also apply:

1. Friable asbestos-containing material that is crumbled, pulverized or powdered and that is lying on any surface in the work area shall be cleaned up and removed using a vacuum equipped with a HEPA filter or by damp wiping and everything shall be removed from the work area or covered with polyethylene sheeting or other suitable material that is impervious to asbestos.

2. The spread of dust from the work area shall be prevented by an enclosure of polyethylene or other suitable material that is impervious to asbestos, if the work area is not enclosed by walls, and by a decontamination facility consisting of a series of interconnecting rooms including,

i. a room suitable for changing into protective clothing and for storing contaminated protective clothing and equipment,

ii. a shower room as described in paragraph 7,

iii. a room suitable for changing into street clothes and for storing clean clothing and equipment, and

iv. curtains of polyethylene sheeting or other suitable material that is impervious to asbestos, fitted to each side of the entrance or exit to each room.

3. The rooms described in subparagraphs 2 i, ii and iii shall be arranged in sequence and constructed so that any person entering or leaving the work area must pass through each room.

4. The mechanical ventilation system serving the work area shall be disabled and all openings or voids, including ventilation ducts to or from the work area, shall be sealed by tape or other appropriate means.

5. Unless the operation is carried on inside a building that is to be demolished and will not be entered by any person except the workers involved in the operation and the workers involved in the demolition, the spread of dust from the work area shall also be prevented by,

i. creating and maintaining within the enclosed area, by installing a ventilation system equipped with a HEPA filtered exhaust unit, a negative air pressure of 0.02 inches of water, relative to the area outside the enclosed area,

ii. ensuring that replacement air is taken from outside the enclosed area and is free from contamination with any hazardous dust, vapour, smoke, fume, mist or gas, and

iii. using a device, at regular intervals, to measure the difference in air pressure between the enclosed area and the area outside it.

6. The ventilation system referred to in subparagraph 5 i shall be inspected and maintained by a competent worker before each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it shall be replaced before the ventilation system is used.

7. The shower room in the decontamination facility shall,

i. be provided with hot and cold water or water of a constant temperature that is not less than 40° Celsius or more than 50° Celsius,

ii. have individual controls inside the room to regulate water flow and, if there is hot and cold water, individual controls inside the room to regulate temperature,

iii. be capable of providing adequate supplies of hot water to maintain a water temperature of at least 40° Celsius, and

iv. be provided with clean towels.

8. When leaving the work area, a worker shall enter the decontamination facility and shall, in the following order,

i. decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing,

ii. if the protective clothing will not be reused, place it in a container as described in paragraph 5 of section 15,

iii. shower, and

iv. remove and clean the respirator.

9. If practicable, existing electrical power distribution systems that are not water-tight shall be de-energized and locked out where wet removal operations are to be carried out.

10. Temporary electrical power distribution systems for tools and equipment involved in wet removal operations shall be equipped with ground fault circuit interrupters.

11. Friable asbestos-containing material shall be thoroughly wetted before and during removal, unless wetting would create a hazard or cause damage.

12. The work area shall be inspected by a competent worker for defects in the enclosure, barriers and decontamination facility,

i. at the beginning of each shift,

ii. at the end of a shift if there is no shift that begins immediately after the first-named shift, and

iii. at least once each day on days when there are no shifts.

13. Defects observed during an inspection under paragraph 12 shall be repaired immediately and no other work shall be carried out in the work area until the repair work is completed.

14. If practicable, dust and waste shall be kept wet.

15. On completion of the work,

i. negative air pressure shall be maintained if required by subparagraph 5 i,

ii. the inner surface of the enclosure and the work area inside the enclosure shall be cleaned by a thorough washing or by vacuuming with a vacuum equipped with a HEPA filter,

iii. equipment, tools and other items used in the work shall be cleaned with a damp cloth or by vacuuming with a vacuum equipped with a HEPA filter or they shall be placed in a container as described in

paragraph 5 of section 15 before being removed from the enclosure, and

iv. a visual inspection shall be conducted by a competent worker to ensure that the enclosure and the work area inside the enclosure are free from visible dust, debris or residue that may contain asbestos.

16. Once the work area inside the enclosure is dry after the steps set out in subparagraphs 15 ii, iii and iv have been completed, clearance air testing shall be conducted by a competent worker in accordance with subsection (5), unless the operation is carried on inside a building that is to be demolished and will not be entered by any person except the workers involved in the operation and the workers involved in the demolition.

17. The barriers, enclosure and decontamination facility shall not be removed or dismantled until,

i. cleaning has been done as described in paragraph 15, and

ii. if clearance air testing is required, it has been completed and the work area inside the enclosure has passed the clearance air test. O. Reg. 278/05, s. 18 (4).

(5) The following rules apply to clearance air testing:

1. Sample collection and analysis shall be done,

i. using the phase contrast microscopy method, in accordance with subsection (6), or

ii. using the transmission electron microscopy method, in accordance with subsection (7).

2. If the work area inside the enclosure fails the clearance air test, the steps set out in subparagraphs 15 ii, iii and iv of subsection (4) shall be repeated and the work area shall be allowed to dry before a further test is carried out, unless paragraph 6 of subsection (6) applies. O. Reg. 278/05, s. 18 (5).

(6) Clearance air testing using the phase contrast microscopy method shall be carried out in accordance with U.S. National Institute of Occupational Safety and Health Manual of Analytical Methods, Method 7400, Issue 2: Asbestos and other Fibres by PCM (August 15, 1994), using the asbestos fibre counting rules, and shall comply with the following requirements:

1. Testing shall be based on samples taken inside the enclosure.

2. Forced air shall be used, both before and during the sampling process, to ensure that fibres are dislodged from all surfaces inside the enclosure

before sampling begins and are kept airborne throughout the sampling process.

3. At least 2,400 litres of air shall be drawn through each sample filter, even though the standard mentioned above provides for a different amount.

4. The number of air samples to be collected shall be in accordance with Table 3.

5. The work area inside the enclosure passes the clearance air test only if every air sample collected has a concentration of fibres that does not exceed 0.01 fibres per cubic centimetres of air.

6. If the work area inside the enclosure fails a first test that is done using the phase contrast microscopy method, the samples may be subjected to a second analysis using transmission electron microscopy in accordance with the standard mentioned in subsection (7).

7. When a second analysis is done as described in paragraph 6, the work area inside the enclosure passes the clearance air test only if every air sample collected has a concentration of asbestos fibres that does not exceed 0.01 fibres per cubic centimetre of air. O. Reg. 278/05, s. 18 (6).

(7) Clearance air testing using the transmission electron microscopy method shall be carried out in accordance with U.S. National Institute of Occupational Safety and Health Manual of Analytical Methods, Method 7402, Issue 2: Asbestos by TEM (August 15, 1994), and shall comply with the following requirements:

1. Testing shall be based on samples taken inside the enclosure and samples taken outside the enclosure but inside the building.

2. Forced air shall be used inside the enclosure, both before and during the sampling process, to ensure that fibres are dislodged from all surfaces before sampling begins and are kept airborne throughout the sampling process.

3. At least 2,400 litres of air shall be drawn through each sample filter, even though the standard mentioned above provides for a different amount.

4. At least five air samples shall be taken inside each enclosure and at least five air samples shall be taken outside the enclosure but inside the building.

5. Sampling inside and outside the enclosure shall be conducted concurrently.

6. The work area inside the enclosure passes the clearance air test if the average concentration of asbestos fibres in the samples collected inside the enclosure is statistically less than the average concentration of asbestos fibres in the samples collected outside the enclosure, or if there

is no statistical difference between the two average concentrations. O. Reg. 278/05, s. 18 (7).

(8) Within 24 hours after the clearance air testing results are received,

(a) the owner and the employer shall post a copy of the results in a conspicuous place or places,

(i) at the workplace, and

(ii) if the building contains other workplaces, in a common area of the building; and

(b) a copy shall be provided to the joint health and safety committee or the health and safety representative, if any, for the workplace and for the building. O. Reg. 278/05, s. 18 (8).

(9) The owner of the building shall keep a copy of the clearance air testing results for at least one year after receiving them. O. Reg. 278/05, s. 18 (9).

Instruction and training

19. (1) The employer shall ensure that instruction and training in the following subjects are provided by a competent person to every worker working in a Type 1, Type 2 or Type 3 operation:

1. The hazards of asbestos exposure.

2. Personal hygiene and work practices.

3. The use, cleaning and disposal of respirators and protective clothing. O. Reg. 278/05, s. 19 (1).

(2) The joint health and safety committee or the health and safety representative, if any, for the workplace shall be advised of the time and place where the instruction and training prescribed by subsection (1) are to be carried out. O. Reg. 278/05, s. 19 (2).

(3) Without restricting the generality of paragraph 3 of subsection (1), the instruction and training related to respirators shall include instruction and training related to,

(a) the limitations of the equipment;

(b) inspection and maintenance of the equipment;

(c) proper fitting of a respirator; and

(d) respirator cleaning and disinfection. O. Reg. 278/05, s. 19 (3).

Asbestos abatement training programs

20. (1) The employer shall ensure that,

(a) every worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Worker Training Program approved by the Ministry of Training, Colleges and Universities; and

(b) every supervisor of a worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Supervisor Training Program approved by the Ministry of Training, Colleges and Universities. O. Reg. 278/05, s. 20 (1).

(2) The employer shall ensure that every worker and supervisor successfully completes the appropriate program required under subsection (1) before performing or supervising the work to which the program relates. O. Reg. 278/05, s. 20 (2).

(3) A document issued by the Ministry of Training, Colleges and Universities, showing that a worker has successfully completed a program mentioned in subsection (1), is conclusive proof, for the purposes of this section, of his or her successful completion of the program. O. Reg. 278/05, s. 20 (3).

(4) In accordance with the *Agreement on Internal Trade, 1995* and the *Protocols of Amendment*, a worker shall be deemed to hold a document showing successful completion referred to in subsection (3) if he or she has successfully completed equivalent training in another province or territory of Canada, as determined by the Director. O. Reg. 278/05, s. 20 (4).

Asbestos work report

21. (1) The employer of a worker working in a Type 2 operation or a Type 3 operation shall complete an asbestos work report in a form obtained from the Ministry for each such worker,

(a) at least once in each 12-month period; and

(b) immediately on the termination of the employment of the worker. O. Reg. 278/05, s. 21 (1).

(2) As soon as the asbestos work report is completed, the employer shall,

(a) forward it to the Provincial Physician, Ministry of Labour, and

(b) give a copy to the worker. O. Reg. 278/05, s. 21 (2).

(3) For the purposes of clause (2) (a), the employer may deliver the report to the Provincial Physician in person or send it by ordinary mail, by courier or by fax. O. Reg. 278/05, s. 21 (3).

Asbestos Workers Register

22. (1) The Provincial Physician, Ministry of Labour, shall establish and maintain an Asbestos Workers Register listing the name of each worker for whom an employer submits an asbestos work report under section 21. O. Reg. 278/05, s. 22 (1).

(2) On the recommendation of the Provincial Physician, a worker who is listed in the Register may volunteer to undergo the prescribed medical examination described in paragraph 1 of subsection (4). O. Reg. 278/05, s. 22 (2).

(3) A worker who has undergone the prescribed medical examination described in paragraph 1 of subsection (4) may volunteer to undergo subsequent examinations of the same type if they are recommended by his or her physician. O. Reg. 278/05, s. 22 (3).

(4) The following medical examinations are prescribed for the purposes of subsection 26 (3) of the Act:

1. An examination consisting of a medical questionnaire, chest x-rays and pulmonary function tests.

2. A subsequent examination that consists of the components described in paragraph 1, is recommended by the worker's physician and takes place at least two years after the most recent examination. O. Reg. 278/05, s. 22 (4).

(5) A worker who is removed from exposure to asbestos because an examination discloses that he or she may have or has a condition resulting from exposure to asbestos and suffers a loss of earnings as a result of the removal from exposure to asbestos is entitled to compensation for the loss in the manner and to the extent provided by the *Workplace Safety and Insurance Act, 1997*. O. Reg. 278/05, s. 22 (5).

Use of equivalent measure or procedure

23. A constructor, in the case of a project, or the employer, in any other case, may vary a measure or procedure required by this Regulation if the following conditions are satisfied:

1. The measure or procedure, as varied, affords protection for the health and safety of workers that is at least equal to the protection that would be provided by complying with this Regulation.

2. The constructor or employer gives written notice of the varied measure or procedure, in advance, to the joint health and safety committee or the health and safety representative, if any, for the workplace. O. Reg. 278/05, s. 23.

Notice to inspector

24. (1) When this Regulation requires written notice to an inspector at an office of the Ministry of Labour, the notice shall be given,

(a) by delivering it to the office in person;

(b) by sending it by ordinary mail, by courier or by fax, or

(c) by sending the notice to the inspector by electronic means that are acceptable to the Ministry. O. Reg. 278/05, s. 24 (1).

(2) When this Regulation requires oral notice to an inspector at an office of the Ministry of Labour, the notice shall be given,

(a) in person;

(b) by telephoning the inspector; or

(c) by sending the notice to the inspector by electronic means that are acceptable to the Ministry. O. Reg. 278/05, s. 24 (2).

25. Omitted (revokes other Regulations). O. Reg. 278/05, s. 25.

26. Omitted (provides for coming into force of provisions of this Regulation). O. Reg. 278/05, s. 26.