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1. Introduction

Serious health concerns arose in the late 1970's when asbestos factory workers, asbestos miners and installers suffered from higher incidences of several respiratory diseases. These workers were exposed to *very high levels* of asbestos dust for *prolonged periods*.

In response the growing fear of asbestos in buildings, the Ontario Royal Commission on Matters of Health and Safety Arising from the Use of Asbestos in Ontario was established in 1981. A three year study was conducted. The study analyzed asbestos, from its production, through its installation, use-in-place, maintenance and demolition of. The Commission reviewed its findings and concluded that building occupants are exposed to a fraction of the risk that asbestos workers are exposed to.

In May 1981, Lakehead University undertook a complete Asbestos Audit of its facilities and found the substance was present in most buildings, in one form or another. Since that time, they have endeavored to remove and/or encapsulate areas where employees frequent. Many asbestos containing materials were banned from manufacture, in 1985. Unfortunately, asbestos has been found in buildings built up until 1995, because stockpiled materials were still available. Most buildings built past 1995 do not contain asbestos; notwithstanding, it is always prudent to work cautiously when there is a possibility of *any hazardous material* on site.

a. Purpose

In November 2005, the Ontario Regulation; '**278/05 Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations**', as part of the *Occupational Health & Safety Act*, was revised. This regulation refers to the term; "occupier". It is important to clarify what an 'occupier' is:

"occupier" is defined in O.Reg. 278/05 as having the same meaning as in the *Occupiers' Liability Act R.S.O. 1990, Chapter 0.2*:

"occupier" includes:

- (a) a person who is in physical possession of premises, or
- (b) a person who has responsibility for and control over the condition of premises or the activities there carried on, or control over persons allowed to enter the premises, despite the fact that there is more than one occupier of the same premises; ("occupant").

The revised regulation states that the Owner shall prepare and keep on the premises, a record containing asbestos information, relevant to it's buildings; (Section 8, Sentence (3), Clause (a)).

Physical Plant hired an asbestos consultant, via the university tendering protocol, to re-audit the campus, in 2006. The campus has since and will continue to be audited annually; and thus, the 'record' will be as well. The 'record', (detailed survey report) is available for viewing at the office of the Physical Plant Department, in the Avila Centre.

The Physical Plant department has written the Asbestos Control Program to document the work procedures practiced on campus, by its internal employees and external contractors.

2. Hazards of Asbestos Exposure

a. What is Asbestos?

The term “asbestos” refers to a family of naturally occurring fibrous (asbestiform) hydrated silicates divided on the basis of mineralogical features into two groups: serpentines and amphiboles. The important and distinguishable property of asbestos, compared with non-asbestiform minerals, is the presence of long, thin fibres that can be easily separated. According to some definitions, there are as many as 30 varieties of asbestos; however, only six are of commercial importance. These six are: actinolite, amosite, anthophyllite, chrysotile, crocidolite, and tremolite. Asbestos is mined by crushing and drawing the asbestos from the veins of the host rocks. The retrieved fibres are sealed in plastic, then shipped to the consumer.

Chrysotile is the only asbestiform member of the serpentine group of minerals. Although commonly termed “white asbestos,” chrysotile fibres may also be green, grey, amber or pink in colour. Chrysotile fibres have high tensile strength, high resistance to alkalis, high flexibility, good spin ability and effective binding agent when mixed with cement or plastic. It is also an effective thermal and electrical insulator. About 90 per cent of world asbestos production is chrysotile.

Amphibole asbestos fibres are different from the flexible, curly chrysotile fibres because they are straight and needle-like. These fibre characteristics appear to give amphibole asbestos a greater tendency to become airborne, which is important to the control of exposure. Two types of amphibole asbestos have been widely used: crocidolite or “blue asbestos” and amosite or “brown asbestos.” Anthophyllite, tremolite, and actinolite asbestos have been rarely used commercially.

b. How Has Asbestos Been Used?

The ability of asbestos to withstand high temperatures, its strength, its resistance to many corrosive chemicals and its other properties have resulted in hundreds of applications for asbestos. The construction industry has been, the biggest user of asbestos, particularly as insulation in the 1960’s and 1970’s. Although the use of asbestos has dropped dramatically in recent years, its past widespread use, particularly as an insulating material in buildings, means that it will continue to pose a potential hazard to the renovation and demolition sectors of the construction industry. Asbestos containing materials, (ACM) can be divided into two groups; friable and non-friable. This division is helpful for hazard assessment. Friability occurs when the material can be crumbled or pulverized or powdered with hand pressure. Friable asbestos can cause harmful airborne dust levels when disturbed. Consequently, the use of friable materials is banned in the construction industry.

The largest single use of asbestos is as a reinforcing agent in cement products. Asbestos-cement products include flat and corrugated sheets, pipes and shingles. Another major use is friction materials, including linings for drum and disc brakes as well as clutch facings. Other asbestos-containing products are vinyl asbestos flooring, gaskets and curtains, roofing felts, coatings and mastics, and asbestos paper products.

Amosite and Chrysotile in combination and, to a lesser extent, crocidolite were widely used in sprayed insulation as steel fireproofing. Asbestos pipe and boiler insulation was used on heating systems in buildings, including homes, and in industrial processes. Additionally, the insulation was exposed to

provide a decorative architectural finish, and/or, it doubled as acoustical insulation. In 1973 the spray application of asbestos insulation ceased when new regulations were introduced under the Ontario Construction Safety Act. Also in 1973, the major Ontario suppliers of pipe and boiler insulation stopped using asbestos in their products.

c. Characteristics of Airborne Asbestos

Asbestos fibres split lengthwise, becoming thinner and thinner. They can become so thin that they are not visible with the best optical microscope. An average asbestos fibre diameter is 0.11 – 0.24 micrometers (μm). (A micrometer is $1/1000^{\text{th}}$ of a millimetre.) In comparison, a human hair is $\sim 75 \mu\text{m}$ and a glass fibre is usually 3-15 μm in diameter.¹

Asbestos can remain airborne for a long time because it is so fine. The aerodynamics of settling are determined by the mass, form (particularly, diameter), and the orientation of the fibre. Theoretically, a fibre that is 5 μm long and 1 μm in diameter, would require 4 hours to fall 9 feet, in completely still air. Air turbulence could potentially cause the fibre to never settle, or to be re-entrained by air currents, if it did settle.²

d. Why is Asbestos a Health Hazard?

Several diseases are associated with exposure to asbestos. They are asbestosis, mesothelioma, cancer of the lung and other asbestos-related cancers. These are serious, debilitating diseases often resulting in death.

To cause disease, asbestos fibres must be inhaled into the lungs. The lung is a system of branching airways that end in tiny air sacs, called alveoli. There are approximately 300 million alveoli. It is from these air sacs that oxygen from inhaled air enters the bloodstream. This is where inhaled asbestos fibres do their damage. However, only those fibres within a certain size range can gain access to the lung alveoli. Fibres with a diameter greater than three microns are too large and impact with the upper branches of the respiratory system and then are eliminated. Fibres that can enter the lung and cause disease are too small to be visible to the naked eye. When the fibre becomes imbedded in the lungs, it can remain for a long time. An example would be that after 5 years of exposure, 50% of the fibres would remain, furthermore, after 10 years, 25% would remain. Amosite and crocidolite tend to remain longer in the lungs, then chrysotile. This is called “bio-persistence”.³

It is not clear how asbestos fibres cause disease after they enter the lung. For each disease there is a period of latency, usually more than ten years, between first exposure to asbestos and the appearance of the disease. It is this characteristic that makes asbestos disease so insidious; exposure can continue for many years without any outward evidence of harm while disease develops silently within.

Asbestosis

¹ One ten-thousand of an inch

² Asbestos Control in Buildings and Industry; April 2006, Pinchin Environmental

³ Asbestos Control in Buildings and Industry; April 2006, Pinchin Environmental

Asbestosis is characterized by a fibrosis⁴ of the lung tissue, which makes breathing difficult. The most prominent symptom is breathlessness. Early detection of asbestosis is possible by x-ray examination and lung function testing. However, the disease is irreversible and will continue to progress even after exposure has stopped. Rarely a cause of death itself, asbestosis results in an appreciable reduction in life expectancy due to deaths from related illnesses. With the exception of the most severe cases, the latency period is usually 15-20 years after exposure. The risk of asbestosis is directly related the dose of exposure; increasing the duration and intensity of exposure.

Mesothelioma

This is a rare cancer arising from the cells of the pleura⁵ and the peritoneum⁶. The development of mesothelioma is characterized by a long latency period, usually lasting about 15 years and sometimes more than 40. There is no effective treatment of mesothelioma. Large portions of Mesothelioma patients die within a year of diagnosis; few survive longer than five years. Although asbestos was once thought to be responsible for all mesothelioma, other causes have now been identified. Still, the chance of getting mesothelioma in the absence of asbestos exposure is considered to be extremely remote.

Lung Cancer

Lung cancer is not associated asbestos exposure only. There is no basic difference between lung cancer caused by asbestos and that due to other causes. In general, the risk of getting lung cancer increases with the extent of asbestos exposure, in terms of both intensity and duration. This risk is also greatly enhanced by smoking; most asbestos workers who develop lung cancer are also smokers. The prognosis for persons diagnosed with lung cancer is poor. Only about one in twenty survives longer than five years after it is diagnosed. The latency period when caused by asbestosis is typically 20-40 years after exposure.

Other Asbestos-Related Conditions

A number of less serious effects have been associated with asbestos exposure, such as pleural plaques, asbestos bodies and warts. Pleural plaques are areas of scarring of the pleural surfaces. In general, they are not associated with any functional abnormality and are merely an indicator of asbestos exposure. Occasionally, they can become so widespread that they restrict lung function. Asbestos bodies, also known as “ferruginous bodies,” result when asbestos fibres become coated with a substance containing protein and iron. The asbestos bodies are not harmful and, like pleural plaques, serve as evidence of asbestos exposure. Asbestos warts are harmless skin growths that occur when asbestos fibres penetrate the skin.

⁴ Scarring

⁵ Lining of the chest cavity and lungs

⁶ Lining of the abdominal cavity

3. OH&S Act: Designated Substance - Asbestos – on Construction Projects and in Buildings and Repair Operations – O. Reg.278/05

The following is several applicable sections of O.Reg. 278/05, which is used to guide the Physical Plant Asbestos Control Program.

a. Section 5: 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.
- 5.(2) The constructor or employer shall advise the worker and provide him or her with the following information:
- 1. The location of the 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.

b. Section 8: Ongoing asbestos management in buildings after transitional period:

- 8.(1) This section applies on and after November 1, 2007.
- (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).
- (3) If this section 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 any 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 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 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
- (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.
- (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.
- (6) If updating under subsection (5) results in any change to the record, clauses (3)(b), (c) and (d) apply with necessary modifications.
- (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.
- (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.
- (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.

(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.

(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.

c. Section 9: 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.

d. Section 10: 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.

(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.

(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.

(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).

(5) An owner shall give any prospective constructor a copy of the complete report prepared under subsection (4).

(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.

- (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.
- (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.
- (9) The written notice referred to in subsection (8) shall include the information referred to in clauses 11(3)(a) to (f).
- (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.
- (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.

e. Section 19: Instruction & Training:

19. (1) The employer shall ensure that instruction and training in the following subjects are provided by a competent person to every person 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.
- (2) The joint health and safety committee or 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.
- (3) Without restricting the generality of paragraph 3 of subsection (1), the instruction and training related to respirators shall include instructions 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.

f. Section 21: Asbestos Work Report:

- (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.
- (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.

(3) For the purpose 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.

g. Section 14: Measures and procedures, Type 1 operations:

14. Measures and procedures, Type 1 operations – 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.

h. Section 15: 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 to the work area with a NIOSH approved respirator in accordance with Table 2, (*see Appendix*), 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.

i. Section 16: 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 section 15, (*Measures and Procedures, Type 2 and Type 3 Operations*).
- 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.

j. Section 17: 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 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,
- iv. the work area shall be cleaned by damp wiping or by cleaning with a vacuum equipped with a HEPA filter.

k. Section 18: Additional measures and procedures, Type 3 operations:

18. (1) In addition to the measures 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.

(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.

(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 section 15,
 - iii. shower, and
 - iv. remove and clean the respirator.

(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 subparagraph 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 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 of 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 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 enclosures 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.

(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.

(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 provide 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 centimeters 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 fibre that does not exceed 0.01 fibres per cubic centimeter of air.
- (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.
- (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.
- (9) The owner of the building shall keep a copy of the clearance air testing results for at least one year after receiving them.

I. Section 13: 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.
- (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.
- (3) If respirators are used in the workplace,
- (a) the employer shall establish written procedures, (*see Appendix*) 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.
- (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.

4. Roles of the Physical Plant Department

a. Role of Senior Managers: (Director & Managers)

1. The Director and Project Managers shall provide the resources and direction necessary to support and maintain an effective Asbestos Control Program.

b. Role of the Physical Plant Department:

1. The Physical Plant Department is responsible for the implementation and management of the Asbestos Control Program, (ACP), that shall include, but not be limited to the following:

- (a) assignment of an Asbestos Coordinator, who shall be the Space and Capital Planning Manager, to manage the Physical Plant ACP.
- (b) guidelines for the implementation of a Type 1, Type 2 (w/o enclosure), Type 3 or Glove Bag procedures for employees and contractors,
- (c) training programs for employees, whose jobs involve possible exposure to asbestos disturbance
- (d) a record of employees trained and potentially exposed to asbestos containing materials, shall be available on Physical Plant's X Drive.
- (e) a current audit which identifies all locations and relevant information, including floor plans, (as per the Regulation), of asbestos containing materials on campus
- (f) communication to employees and contractors who may disturb asbestos containing materials
- (g) annual inspections of all asbestos containing materials on campus
- (h) asbestos waste containment and disposal procedures.

c. Role of Asbestos Coordinator:

1. The Asbestos Coordinator shall manage and coordinate the following components of the Asbestos Control Program.

- (a) Direction of Scheduled and Unscheduled Work
- (b) Program Maintenance and Administration, inclusive of the Record of Information
- (c) Audit Maintenance and Annual Inspections

d. Role of Project Managers & Leadhands:

1. The Project Managers & Leadhands shall ensure that:

- (a) the Asbestos Coordinator is contacted for all projects that involved direct or potential contact with asbestos containing materials
- (b) contractors and their employees are aware of the Asbestos Control Program and the Record of Information available
- (c) employees, such as the tradesmen and housekeeping positions, have been orientated and trained as per the O.H. & S. O. Reg. 278/05
- (d) only authorized individuals trained in asbestos work procedures and equipped with the required protective equipment are assigned to work involving direct or possible contact with asbestos containing material.
- (e) communication to all people affected by the work
- (f) any requirement for medical surveillance of involved workers is in place
- (g) all asbestos-containing waste material is disposed of in the manner prescribed by the Asbestos Control Program

APPENDIX

a. Implementation of Asbestos Work Procedures:

1. All university construction 'work', such as alterations, renovations or demolitions must go through the Physical Plant department, via Work Order, or Request for Non-Maintenance.
2.
 - a) Upon receiving the Work Order, the Leadhand shall assess the situation for potential asbestos and decide, with consultation with a Manager and/or Asbestos Coordinator, what type of asbestos removal is required.
 - b) If the work is a 'project', the Manager shall assess the space, via HMIS and decide what type of asbestos removal is required. The decision shall be forwarded to the Asbestos Coordinator, for HMIS editing.
3. By whom the asbestos work will be completed by, is *always* at the discretion of the Asbestos Coordinator and/or the Manager; notwithstanding, the following guidelines will be followed:
 - a) **Type 1 work:** completed in-house, by the respective trades employees
 - b) **Type 2 work:** completed in-house by the respective trades employees; or in co-ordination with a contractor.
 - c) **Type 2 with Enclosure work,** or Glove Bag: 'contracted out'
 - d) **Type 3 work:** 'contracted out'
4. Type 1 or 2 work completed by in-house staff shall follow these procedures:
 - a) Leadhand and/or Supervisor shall review the Asbestos Decision Flowchart; and/or discuss with the Asbestos Co-ordinator.
 - b) "Asbestos Change of Record" form shall be completed based on work complete and submitted to the Asbestos Coordinator.
5. All 'contracted out' asbestos work shall be managed through the Asbestos Coordinator and the Manager. Dependent upon the project, the asbestos work shall be tendered out or completed by the Hourly Contractor.

b. Lakehead University Respirator Procedure:

1. Lakehead University's Respirator Procedure shall follow the guidelines set out the regulations; Asbestos on Construction Projects and in Buildings and Repair Operations - 278/05.
 - a) Respirators shall be fit tested annually by the trades employees, as organized by the Asbestos Coordinator, in conjunction with the Asbestos Refresher Training.
 - b) Trades employees shall use, maintain and store their respirator as per the manufacturer's instructions.
 - i) Replacement cartridges shall be replaced as per the manufacturer's instructions, and purchased by Lakehead University.
 - ii) Any damaged parts shall be brought forward to the Leadhand, who will speak to their Supervisor for direction.

Column 1	Column 2
Work Category	Required Respirator
<i>Type 1 Operations</i>	
Worker requests that the employer provide a respirator to be used by the worker, as described in paragraph 12 of section 14	Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter
<i>Type 2 Operations</i>	
Work described in paragraph 1 of subsection 12(3)	One of the following: • Air purifying full-facepiece respirator with N-100, R-100 or P-100 particulate filter • Powered air purifying respirator equipped with a tight-fitting facepiece (half or full-facepiece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter • Negative pressure (demand) supplied air respirator equipped with a full-facepiece • Continuous flow supplied air respirator equipped with a tight fitting facepiece (half or full-facepiece)
Work described in paragraphs 2 to 7 and 9 to 11 of subsection 12(3)	Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter.
Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non friable material containing asbestos by means of power tools, if the tool is attached to a dust collecting device equipped with a HEPA filter as described in paragraph 8 of subsection 12(3)	Material is not wetted Material is wetted to control spread of fibre One of the following: • Air purifying full facepiece respirator with N-100, R-100 or P-100 particulate filter • Powered air purifying respirator equipped with a tight-fitting facepiece (half or full-facepiece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter. • Negative pressure (demand) supplied air respirator equipped with a full-facepiece • Continuous flow supplied air respirator equipped air respirator equipped with a tight fitting facepiece (half or full-facepiece) • Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter

<i>Type 3 Operations</i>		
Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable material containing asbestos by means of power tools, if the tool is not attached to a dust collecting device equipped with a HEPA filter as described in paragraph 5 of subsection 12(4)	Material is not wetted Material is wetted to control spread of fibre	Pressure demand supplied air respirator equipped with a half mask One of the following: • Air purifying full-facepiece respirator with N-100, R-100 or P-100 particulate filter • Powered air purifying respirator equipped with a tight-fitting facepiece (half or full-facepiece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter • Negative pressure (demand) supplied air respirator equipped with a full-facepiece • Continuous flow supplied air respirator equipped with a tight fitting facepiece (half or full-facepiece)
Work with friable materials containing asbestos, as described in paragraphs 1 to 4 and 6 of subsection 12(4)	Material is not wetted	Pressure demand supplied air respirator equipped with a full facepiece
Work with friable materials, as described in paragraphs 1 to 4 and 6 of subsection 12(4), that contains a type of asbestos other than chrysotile	Material was applied or installed by spraying, and is wetted to control spread of fibre	Pressure demand supplied air respirator equipped with a half mask
Work with friable materials, as described in paragraphs 1 to 4 and 6 of subsection 12(4), that contains only chrysotile asbestos	Material was applied or installed by spraying, and is wetted to control spread of fibre	One of the following: • Air purifying full-facepiece respirator with N-100, R-100 or P-100 particulate filter • Powered air purifying respirator equipped with a tight-fitting facepiece (half or full-facepiece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter • Negative pressure (demand) supplied air respirator equipped with a full-facepiece • Continuous flow supplied air respirator equipped with a tight fitting facepiece (half or full-facepiece)

Work with friable material containing asbestos, as described in paragraphs 1 to 4 and 6 of subsection 12(4)	Material was not applied or installed by spraying, and is wetted to control spread of fibre	One of the following: • Air purifying full-facepiece respirator with N-100, R-100 or P-100 particulate filter • Powered air purifying respirator equipped with a tight-fitting facepiece (half or full-facepiece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter • Negative pressure (demand) supplied air respirator equipped with a full-facepiece • Continuous flow supplied air respirator equipped with a tight fitting facepiece (half or full-facepiece)
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