



St. Francis Xavier University

Asbestos Management Plan

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Table of Contents

1.0	Policy Objectives	page 3
2.0	Guiding Principles	page 4
3.0	Scope	page 5
3.1	Uses of Asbestos in Buildings	page 5
3.1.1	Friable Asbestos Materials	page 5
3.1.2	Non-Friable Asbestos Materials	page 6
4.0	Categories of Asbestos Work	page 8
4.1	Emergency Work Procedures	page 8
4.2	Categories of Planned Asbestos Work	page 8
4.2A	Category 1 Low Risk Work Procedures	page 9
4.21	Removal of vinyl asbestos floor tile	page 11
4.22	Installing, cutting or drilling non-friable asbestos materials	page 12
4.23	Removing or drilling asbestos containing cement board	page 12
4.24	Emergency clean-up of asbestos containing debris (< 1 metre square)	page 13
4.25	Removal or replacement of five or less asbestos containing compressed mineral fibre type ceiling tiles	page 13
4.26	Collecting samples of asbestos suspect friable materials	page 14
4.2B	Category 2 Moderate Risk Work Procedures	page 15
4.27	Minor Repair to Asbestos Containing Plaster Ceiling and Walls	page 15
4.2C	Category 3 High Risk Work	page 18
5.0	Asbestos Inventory and Identification	page 19
5.1	Asbestos Inventory	page 19
5.2	Asbestos Identification	page 19
5.3	Asbestos Sampling	page 20
6.0	Inspection	page 20
7.0	Access Control	page 21
8.0	Repair and Maintenance of Asbestos-Containing Material	page 21
9.0	Training and Education	page 22
9.1	Level 1 Training	page 22
9.2	Level 2 Training	page 23
9.3	Level 3 Training	page 23
9.4	Work Contracted to External Firms	page 23
9.5	Asbestos Removal Work	page 23
9.6	Other Contracted Work	page 23
11.0	Disposal of Asbestos-Containing Waste	page 24
12.0	Respirator Fitting, Inspection, Cleaning and Disinfection	page 24
12.1	Respirator Fitting	page 24
12.2	Inspection Items prior to Each Use	page 25
12.3	Respirator Cleaning and Disinfection	page 25
12.4	Filter Cartridge handling and replacement	page 26
13.0	Glove Bag Work Procedure	page 26
14.0	Asbestos Safe Work Procedures	page 30
14.1	Discovering Damaged Asbestos	page 30
14.2	Cleanup of Asbestos Containing Material	page 31
14.3	Work with non-Friable Asbestos Containing Material	page 32
14.4	Working above False Ceiling where Asbestos is Present	page 32
14.5	Repairs to Asbestos Containing Insulation	page 33
14.6	Minor Repairs to Asbestos Containing Plastered Ceiling and Walls	page 34
14.7	Single Use Glove Bag Procedure	page 35
14.8	Multiple Use Glove bag Procedure	Page 36
14.9	Clean-up of Asbestos Waste Disposal Bags	page 38
14.10	Disposal of Asbestos Containing Waste Materials	page 40

Asbestos Management

Plan Policy Objectives

It is the objective of this Policy to provide and maintain a healthy and safe environment for faculty, staff, students and the general public working, studying or visiting the University.

Asbestos on campus in its present condition poses no health risk to anyone, so long as it is not disturbed, i.e. drilled into or cut, etc. In the interest of safety, members of the university community are reminded that walls, ceilings and floors should not be disturbed except by trained maintenance employees. All members of the St. Francis Xavier University community should rest assured that provided the asbestos is not disturbed, no health risk exists.

However St. Francis Xavier University recognizes that inhalation of asbestos fibres can lead to illness. Asbestos containing material has been known to man for centuries and has been used in literally hundreds of products. Many of the University buildings were constructed before the harmful effects of asbestos were known. Where asbestos was commonly used up to the mid 1970's it was installed in many of the University's buildings because it is strong, insulates well, and resists fire and corrosion.

Despite the fact that over the past number of years St. Francis Xavier University has made considerable strides in removing asbestos from buildings, asbestos remains in many locations. Thus, it is likely to be encountered as renovations open concealed areas of buildings.

St. Francis Xavier University is committed to managing the asbestos that is present in University buildings, to minimize exposure to airborne asbestos and thus protect the health of all people. The University's long term goal is to remove all asbestos from all its buildings.

In dealing with the asbestos which remains in University buildings, Facilities Management has developed in co-operation with the University's Joint Occupational Health and Safety Committee, an Asbestos Management Program. The overall objective of the Asbestos Management Program is to ensure that no-one is exposed to harmful air-borne asbestos fibres.

1.0 Guiding Principles

The Guiding Principles of the University's Asbestos Control Program are:

- 2.1 Identification of the locations where asbestos containing material is present.
- 2.2 Establish an inventory of all suspect or confirmed asbestos.
- 2.3 Establish procedures for the notification of all workers, custodial and maintenance staff, other employees outside contractors, and building tenants, etc, whose work will or may result in the disturbance of (or could damage) any suspect or confirmed asbestos containing materials.
- 2.4 Provide training for all staff of the University and any other personnel (i.e. summer maintenance employees, outside contractors) required to work on or near any asbestos containing material or whose activities in the building may result in the disturbance of asbestos. The training shall include the proper use and maintenance of required personal protective equipment, the use of isolation techniques as needed, the use of correct equipment, and decontamination techniques for work areas and personal protection.
- 2.5 Establish asbestos safe work procedures for the repair, clean-up, or removal of minor amounts of asbestos-containing material during routine maintenance, minor renovations, or demolition.
- 2.6 Monitor external contractors firms who specialize in asbestos work to ensure all site specific contract documentation and safe work procedures are in compliance with the Nova Scotia Department of Labour and Workforce Development and St. Francis Xavier University JOHSC Policy and Procedures Manual.
- 2.7 Perform regular campus wide inspections of asbestos-containing material to ensure that asbestos is properly enclosed and/or encapsulated.
- 2.8 Perform prompt removal or repair of any asbestos containing material which has been damaged and/or in disrepair.
- 2.9 Ensure that all staff, faculty, students and administrators are made aware of their responsibility to control activities that may disturb any suspect or known asbestos.
- 2.10 To be in compliance with the NS Department of Labour and Advance Education Code of Practice entitle Asbestos in the Workplace: A Guide to Assessment & Management of Asbestos in the Workplace and A Guide to Removal of Friable Asbestos Containing Material.

3 Scope

This Program applies to all buildings and structures owned by the University, to all faculty, and staff of the University, to all students and occupants of University buildings and to external organizations who may come into contact with or disturb asbestos-containing material in University buildings. The Program applies to routine work during which an employee might encounter asbestos as well as work undertaken to repair or remove asbestos-containing material.

3.1 Uses of Asbestos in Buildings

Asbestos has been widely used in buildings and some uses continue today. The uses of asbestos are generally classed into two groups; friable and non-friable products.

Friable material when dry can be crumbled, pulverized or powdered by hand pressure. The use of friable materials in construction is banned today but due to the widespread use of friable materials in the past, these materials still are present in many buildings. Examples of this type of asbestos containing materials are; sprayed fireproofing or insulation, applied texture or acoustic plasters, and insulations.

Non-friable material when dry can not be crumbled, pulverized or powdered by hand or moderate pressure. Examples of this type of asbestos containing material are; vinyl tiles, asbestos cement tiles, gaskets, seals, friction products, drywall compound, and asbestos cement products.

3.1.1 Friable Asbestos Materials

These products are the main concern of the public and most asbestos management programs due to the ease of fibre release. None of the products are still in production.

- **Spray or Trowel Applied Fireproofing or Sprayed Insulation**

Several types of fireproofing or insulation were used in the period encompassing the mid 1930's through to about 1974. Fibrous products were spray applied after being blown as a dry mix through an application gun. These products may contain up to 90% asbestos and any of the three major types (chrysotile, amosite or crocidolite). Cementitious products were trowel applied or sprayed as a wet slurry. These were harder products which did not contain more than 25% asbestos. Only chrysotile asbestos was used in the cementitious type materials.

- **Sprayed or Trowel Applied Texture or Acoustic Plasters**

The use of asbestos was widespread in trowel applied or sprayed texture coats, stipple coats or acoustic plasters commencing in the 1950's through to the late 1970's. These products always contained less than 25% chrysotile. Some of these products may be

considered non-friable in place and only become friable when disturbed by construction or demolition. Other products in this group can be very soft and extremely friable.

- **Mechanical System Insulation**

This is the most widespread use of friable asbestos in buildings. Their use dates from the late 1800's to the late 1970's. The material can have a number of appearances and asbestos contents.

- ◆ white, brown, pink or grey block
- ◆ white or grey corrugated paper
- ◆ white, grey or brown layered paper
- ◆ grey trowel or hand applied material (with the appearance of hard grey dry mud)

It is possible to find all asbestos types in mechanical insulation although chrysotile is predominant.

3.1.2 Non-Friable Asbestos Materials

- **Asbestos-Cement Products**

The largest use of asbestos, in terms of the tonnage of fibres employed, is as a reinforcing agent in cement products. Asbestos-reinforced cement is strong, durable, rigid and resistant to both fire and weather. Such products made from cement, water and asbestos can then be formed into sheets, pipes and a wide variety of other shapes.

The asbestos fibre content of asbestos cement products is usually about 15 percent. Asbestos-cement sheeting that is produced comes in four basic forms: flat sheets, corrugated sheets, siding shingles or roofing shingles. The main use of asbestos cement sheeting is for roofing and for cladding the exterior of buildings.

Other uses are decorative paneling, electrical insulation and laboratory tabletops. Asbestos-cement piping is used for water supply, sewage, irrigation, drainage applications, the transport of corrosive chemical fluids, and electric and telephone conduits. Asbestos cement products are still in production and use today.

- **Gaskets and Packings**

The combination of long asbestos fibres and high temperature rubbers has provided some of the best gasket materials ever produced. The asbestos, in bulk fibre, woven, or plaited form, provides strength and temperature resistance, while the rubber acts as a binder and sealing material.

Asbestos yarns have been commonly used in the manufacture of braided and woven packing materials. Many of these uses, particularly in sheet forms are still in production and use today.

- **Coatings and Sealants**

Asbestos has been used in roof coatings, cements and to a lesser extent, in sealants and caulks. Roof coatings consist of asphalt that has been liquefied with solvents then has had asbestos fibre added as filler. Roof cements are similar, but they are formulated to a thicker consistency so that they can be used to seal openings through which a liquid coating would flow. Some of these are still in production today.

- **Paper Products**

Asbestos paper products are used in a wide variety of applications. Among the most important in construction are roofing felts, gaskets, pipeline wrap, millboard and electrical insulation. Some uses (particularly where impregnated with tar or asphalt for roofing and pipeline wrap) are still in production today.

- **Plastics**

Asbestos has been used as a reinforcing agent in a wide range of asbestos/polymer composites. Applications include: brake and transmission components, floor tiles, engine housings, bins and containers, a variety of coatings, adhesives, caulks, sealants and patching compounds. Two areas have dominated asbestos use in plastics: phenolic moulding compounds and vinyl-asbestos tile. Few of these products remain in production today.

- **Friction Materials**

Asbestos has been used in the manufacture of brake and clutch linings and pads. The asbestos fibres may be embedded in a phenolic resin with various mixtures of fillers or a woven asbestos cloth may be impregnated with the resin. Friction products are primarily used in vehicles but may be used in any rotating machinery. They are still widely produced and used.

- **Asbestos Textiles**

Asbestos textile materials are predominantly manufactured from chrysotile fibres. Two types of yarn are produced: plain, possibly braced with organic fibres, and reinforced, which incorporates either wire or another yarn such as nylon, cotton or polyester.

Major uses for asbestos textiles are gaskets, packings, friction materials, thermal and electrical insulation, and fire resistant applications, e.g. welding curtains, protective clothing, theatre curtains, hot conveyor belts and ironing board covers. These products may be considered or become friable in use. Asbestos textiles are no longer in widespread production.

4 Categories of Asbestos Work

4.1 Emergency Work Procedures

Emergency asbestos procedures shall be implemented when required in order to protect those undertaking the work, as well as to protect all others from or limit exposure to airborne asbestos fibres. Procedures indicated shall be followed as closely as possible in the event of an emergency situation.

Procedures for asbestos work required as an immediate response to floods, pipe breaks, ceiling collapses, or other emergencies that affect asbestos materials areas follows:

- 4.1.1 Clear area of all occupants.
- 4.1.2 The employee is to notify their immediate supervisor of the damage indicating building name, type of asbestos containing material involved, size of area affected and cause of damage (i.e. pipe break).
- 4.1.3 Shut down ventilation system serving area (if applicable).
- 4.1.4 If damage caused by water (i.e. pipe break), the water should be shut off to prevent further damage to building. Worker performing repair shall wear protective respirator and disposable suit.
- 4.1.5 Perform emergency repair with minimum disturbance of asbestos.
- 4.1.6 Isolate the area with caution tape or polyethylene.
- 4.1.7 The Supervisor and Manager shall determine best method of clean up and repair (hazard assessment). The size of area affected should be determined and if asbestos clean up can be completed by trained personal or the work has to be completed by an approved asbestos abatement contractor.
- 4.1.8 Document all aspects of the incident.

4.2 Categories of Planned Asbestos work

Work on asbestos-containing materials can be broken down into three (3) primary categories namely Category 1, Category 2 or Category 3. The controls assigned to each category of work vary depending on the likelihood of the work at hand to release asbestos fibres into the workplace.

4.2A Category 1 Low Risk Work Procedure Category 1 Work Procedures involve:

- 4.21 Removal of vinyl asbestos floor tile.
- 4.22 Installing, cutting or drilling non-friable asbestos materials.
- 4.23 Removing or drilling asbestos containing cement board.
- 4.24 Emergency clean-up of asbestos containing debris (< 1 metre square).
- 4.25 Removal or replacement of five or less asbestos containing compressed mineral fibre type ceiling tiles.
- 4.26 Collecting samples of asbestos suspect friable materials.

Note: Category 1 work procedures assume the non-friable material and minor amounts of friable material can be removed with relatively little loose dry dust release. Generation of debris is permissible as long as the debris can be wetted before being removed. If the work will release more than a trivial amount of dry loose dust, do not proceed. The Supervisor or Manager will determine which of Category 1, 2, or 3 procedures are appropriate.

1. Equipment

All equipment must be onsite before proceeding.

1.1 Vacuum

An asbestos approved vacuum(s), (A high efficiency particulate air filter-HEPA) HEPA filtered equipped with brushes, fittings, etc. Vacuum(s) must not be opened within the facility. The vacuum(s) exterior shall be carefully wet cleaned after work is completed. A HEPA filter is at least 99.97% efficient in collecting a 0.3 micrometer particle and approved for clean up of hazardous materials. The HEPA vacuum must not be opened on-site unless Type 2 work procedures are followed or in a laboratory exhaust hood.

1.2 Respirators

Workers within the designated work area shall wear approved respirators. Respirators and filters will be provided by the employer and individually assigned to workers. Respirators shall be a half-face piece respirator with high efficiency filters (P100). Training in the proper use of the respirator and qualitative fit testing shall be provided. Respiratory protection must comply with the latest CSA Standard Z94.4 "Selection, Use and Care of Respirators". This standard specifies that employees who wear a tight fitting respirator must be clean shaven.

1.3 Protective Clothing

When in the designated work area, all workers shall wear disposable coveralls with attached hood. Coveralls should be worn with the hood in place at all times. Coveralls may be vacuumed or wet wiped clean for re-use for a maximum of 8 hours cumulative wear. Suit and head cover shall remain in place until worker leaves work area. Boot covers or dedicated boots are recommended. Disposable clothing and respirator filters will be disposed of as asbestos waste.

1.4 Other Equipment

- Plastic sheet (6 mil polyethylene) - to cover furniture in the immediate work area and to be used as a drop sheet.
- Duct tape - to seal asbestos waste bags and then fasten polyethylene barriers, if required.
- Labeled asbestos waste bags (6 mil) - for waste from small pieces of debris, disposable suits, used polyethylene, etc.
- Pump sprayer containing water with wetting agent to wet asbestos.
- Asbestos warning signs.
- Cleaning supplies.
- Encapsulating sealer.
- If power tools are used they must be fitted with HEPA dust collectors.

2. Other Protective Measures

2.1 Do not eat, drink or smoke in the work area.

2.2 On completing clean-up of work area, use vacuum and wet cloth (with clean potable water) to clean hands, face, respirator and boots. Remove protective equipment and proceed to nearest wash station to wash exposed skin on hands and face.

3. Preparation

3.1 Before beginning the work, the worker will carefully inspect the asbestos containing material to ensure that the planned work will not create airborne asbestos dust.

3.2 Prior to the start of the project, ensure the work area is un-occupied and asbestos warning signs are posted in the appropriate areas.

3.3 Before disturbing non-friable asbestos materials or minor amounts of friable asbestos materials, (wherever practical) cover floor and surfaces below work with polyethylene sheeting to catch debris.

3.4 Whenever dust on a surface is likely to be disturbed, remove with HEPA vacuum or damp cloth.

4. Execution

4.21 Removal of vinyl asbestos floor tile (if tile are difficult to remove, Category 2 work procedures are required).

4.21.1 Do not use electrical powered scrapers, unless Category 2 work procedures are required.

4.21.2 Start removal by wedging a heavy scraper in seam of two adjoining tiles and gradually force edge of one tile up and away from floor. Do not break off pieces of tile, but continue to force balance of tile up.

4.21.3 Continue removal of tiles using hand tools, removing tiles intact wherever possible. When adhesive is spread heavily or is quite hard, it may prove easier to force scraper through tightly adhered areas by striking scraper handle with a hammer using blows of moderate force while maintaining scraper at 25 to 30 angle to floor. When this technique does not loosen tile, removal can be simplified by heating tile thoroughly with a hot air gun until heat penetrates through tile and softens the adhesive.

4.21.4 As each tile is removed, place into asbestos waste receptor. Do not break into smaller pieces.

4.21.5 After removal of a small area, scrape up adhesive remaining on floor with a hand scraper until only a thin smooth film remains. Where deposits are heavy or difficult to scrape, a hot air gun may be used. Deposit scrapings in the asbestos waste disposal bag. Do not dry scrape surface pieces of tile that remain adhered. Do not use powered electric scrapers.

4.21.5 On completion of the area, vacuum clean floor with HEPA vacuum or wet mop. Dispose of the mop head as contaminated waste.

4.21.6 Dispose of waste as per waste disposal procedures.

4.22 Installing, cutting or drilling non-friable asbestos materials

- 4.22.1 Work using power tools not fitted with HEPA filter dust collectors, must not be performed as Category 1 work.
- 4.22.2 Where possible wet all materials to be disturbed.
- 4.22.3 Immediately place waste in asbestos waste receptor. Clean area frequently during work with HEPA vacuum or by wet methods.
- 4.22.4 At completion of work, drop sheets that will be reused must be cleaned with HEPA vacuum or by wet methods.
- 4.22.5 Drop sheets that will not be reused must be disposed of as asbestos waste.
- 4.22.6 Dispose of waste as per waste disposal procedures.

4.23 Removing or drilling asbestos containing cement board

- 4.23.1 These procedures apply to working with asbestos-containing materials.
- 4.23.2 Use a HEPA vacuum to clean any loose debris in work area prior to cutting board.
- 4.23.3 Place a plastic drop sheet below areas where work is to be performed.
- 4.23.4 Worker must don appropriate PPE, outline in section 1, prior to commencing work.
- 4.23.5 Use gyproc saw to cut holes into asbestos containing material cement board using a HEPA vacuum to control dust. If a power tool is to be used, the tool must be fitted with a HEPA filter dust collector system.
- 4.23.6 Clean surrounding surfaces and the work area frequently with HEPA vacuum or with wet methods.
- 4.23.7 All pulverized or powdered waste must be placed into an appropriate labeled 6 mil asbestos waste bag. The bag must be cleaned and then double bagged. Drop sheets must be disposed as asbestos waste.
- 4.23.8 On completion of work, decontaminate equipment, tools and materials used in the work area by wet cleaning or HEPA vacuum.
- 4.23.9 Before leaving the work area, decontaminate shoes and protective clothing by using HEPA vacuum or damp wiping. When protective clothing is to be disposed

of, it shall be decontaminated as above and placed in labeled disposal bags. Workers shall vacuum all exposed skin, suit and respirator, and proceed to wash station to wash hands and face.

4.23.10 Dispose of waste as per waste disposal procedures.

4.24 Emergency clean-up of asbestos containing debris (< 1 m square area)

4.24.1 Use HEPA vacuum to clean up loose dust and debris. Dry sweeping of asbestos containing waste which will create airborne dust is **not permitted**.

4.24.2 Whenever possible, mist the affected area with amended water to assist in controlling dust.

4.24.3 Large pieces of asbestos containing material will be collected by hand and placed in a labeled asbestos waste bag.

4.24.4 Use wet methods to clean hard surfaces and allow to dry. Once dry HEPA vacuum again to ensure surface is clean.

4.24.5 Repair material which lead to the debris. If removal is required, the supervisor will determine whether the removal will be carried out by a contractor or by Facilities Management staff.

4.24.6 Dispose of waste as per waste disposal procedures.

4.25 Removal or replacement of five or less asbestos-containing compressed mineral fibre type ceiling tiles.

Please note: These procedures assume the ceiling tile can be removed intact with relatively little loose dry dust release. If the work will release more than a trivial amount of dry loose dust or ceiling tiles can not be removed intact, **do not proceed**.

4.25.1 Start removal by wedging a scraper in seam of two adjoining tiles and gradually force edge of one tile up and away from ceiling. Do not break off pieces of tile, but continue to force balance of tile down.

4.25.2 Continue removal of tiles using hand tools, removing tiles intact wherever possible. When adhesive is spread heavily or is quite hard, it may prove easier to force scraper through tightly adhered areas by striking scraper handle with a hammer using blows of moderate force while maintaining scraper at 25 degree to 30 degree angle to ceiling.

5.25.3 As each tile is removed, place into asbestos waste receptor. Do not break into smaller pieces.

On completion of the area, vacuum clean floor with HEPA vacuum or wet mop. Dispose of the mop head and polyethylene drop sheet as contaminated waste.

4.25.4 Dispose of waste as per waste disposal procedures.

4.26 Collecting samples of asbestos-suspect friable materials. Any material with more than 0.5% asbestos is considered an asbestos-containing material (ACM).

4.26.1 Thoroughly wet the sample area with the amended water.

4.26.2 Collect approximately 10 grams (approximately the size of a grape) of the suspect asbestos containing material and place it in the sealable plastic bag. Insure to collect all layers of the sample. For example, plaster normal has two layers.

4.26.3 Label the container with the date, sample number, description of the material sampled, location, and person collecting the sample.

4.26.4 If appropriate, label the sample number next to the sample location.

4.26.5 Temporarily repair the sample area with duct tape, joint fill compound, and/or high temperature insulating cement.

4.26.6 HEPA vacuum or wet clean area to clean up any loose debris or dust. (If appropriate).

4.26.7 To ship sample to PLM laboratory, place the sample in a second sealable bag and send by courier (do not ship via Canada Post). Label waybill as 'Building Material Laboratory Sample; Suspect Asbestos Containing Material'. Check with Courier companies for appropriate shipping procedures.

Work includes the installation or removal of non-friable asbestos in which the asbestos fibre is locked in a binder such as cement, vinyl or asphalt which holds the material together.

4.2.B Category 2 Moderate Risk Work

Involves work with friable asbestos that is of short duration in situations which create low levels of airborne asbestos. Example of category 2 work are enclosure of friable asbestos, application of tape or sealant to asbestos containing pipe insulation and minor removal of friable asbestos and minor installation, maintenance or repair work above false ceilings where sprayed asbestos fireproofing is present on beams.

4.2B Category 2 Work Procedures which can be completed by staff involve:

4.27 Minor repairs to asbestos containing plastered ceilings and walls.

The following modified enclosure method may be used for repairs of asbestos containing plaster on walls and ceilings provided that the job is small enough that it can be completed within one shift without the need for repeated entry into the work area. The size of the plaster repair is limited to the size of the polyethylene enclosure which the HEPA vacuum can adequately provide negative pressure to control dust levels.

All other Category 2 work procedures must be performed by approved asbestos abatement contractor.

Note: Plastered walls and ceilings in several University buildings may contain 3% - 5% chrysotile asbestos. In an undamaged state the asbestos fibre is effectively trapped in the plaster and, as a result, the fibre cannot become airborne. However, during repairs to the plaster, it is possible to create dust from the base coat, which might release fibres into the air. In order to prevent potentially harmful exposures to airborne asbestos fibres, the following procedures will be followed by all those performing minor repairs to plaster wall and ceilings in buildings.

1. Equipment

All equipment must be onsite before proceeding.

1.1 Vacuum

An asbestos approved vacuum(s) (HEPA filtered), equipped with brushes, fittings, etc. Vacuum(s) must not be opened within the facility. The vacuum(s) exterior shall be carefully wet cleaned after work is completed. A HEPA filter is at least 99.97% efficient in collecting a 0.3 micrometer particle and approved for clean up of hazardous materials. The HEPA vacuum must not be opened on-site unless Type 2 work procedures are followed or in a laboratory exhaust hood.

1.2 Respirators:

Respiratory protection must comply with CSA Standard Z94.4 "Selection, Use and Care of Respirators".

Workers within the designated work area shall wear approved respirators. Respirators and filters will be provided by the employer and individually assigned to workers. Respirators shall be a half-face piece respirator with high efficiency filters (P100). Training in the proper use of the respirator and qualitative fit testing shall be provided. Respirators shall be used according to the written procedures for use, provided to the

worker during training sessions. Respirators shall be kept in position throughout the entire time the worker is in the area of the work, from the first disturbance of asbestos containing material, until the final cleaning of the area and removal of waste is completed.

1.3 Protective Clothing

When in the designated work area, all workers shall wear disposable coveralls with attached hood. Coveralls should be worn with the hood in place at all times. Coveralls may be vacuumed or wet wiped clean for re-use for a maximum of 8 hours cumulative wear. Suit and head cover shall remain in place until worker leaves work area. Boot covers or dedicated boots are recommended. Disposable clothing and respirator filters will be disposed of as asbestos waste.

1.4 Other Equipment

- Plastic sheet (6 mil polyethylene) - to cover furniture in the immediate work area and to be used as a drop sheet.
- Duct tape - to seal asbestos waste bags, then fasten polyethylene barriers, if required.
- Labeled asbestos waste bags (6 mil) - for waste from small pieces of debris, disposable suits, used polyethylene, etc.
- Pump sprayer containing water with wetting agent to wet asbestos.
- Asbestos warning signs.
- Cleaning supplies.
- Encapsulating sealer.
- If power tools are used they must be fitted with HEPA dust collectors.

Testing of negative air units is required when the HEPA filter is replaced, at least once every 12 months and whenever a negative air unit is to be vented into an indoor area. HEPA vacuums must be tested when the filter is replaced and at least annually.

2. Other Protective Measures

2.1 Do not eat, drink or smoke in the work area.

2.2 On completing clean-up of work area, use vacuum and wet cloth (with clean potable water) to clean hands, face, respirator and boots. Remove protective equipment and proceed to nearest wash station to wash exposed skin on hands and face.

3. Scheduling of Work

- 3.1 Schedule work when occupants are absent. If persons are present, do not start the work.
- 3.2 If work is required on an emergency basis, and the area is occupied, ensure that Facility Management advises occupants to vacate area until work is completed and clearance is given to return.

4. Preparation

- 4.1 Before beginning the work, the worker will carefully inspect the asbestos containing material to ensure that the planned work and enclosure will control the airborne asbestos dust.
- 4.2 Prior to the start of the project, ensure the work area is un-occupied and asbestos warning signs are posted in the appropriate areas.
- 4.3 Whenever dust on a surface is likely to be disturbed, remove with HEPA vacuum or damp cloth.
- 4.4 Shut down ventilation systems to and from the work area. Seal over all ventilation openings, diffusers, vent grills with plastic and tape.
- 4.5 Where practical, clear areas of movable furnishings or equipment. This should include anything which occupants may wish to use during work period. Any furnishings or equipment not removed shall be adequately covered and sealed using 6 mil polyethylene and tape.
- 4.6 Construct small enclosure around damaged plaster using 6 mil polyethylene and framing (2' x 2' strapping). Limit the size of the enclosure to a volume which the vacuum can adequately provide negative pressure (approximately 125 cubic feet). The enclosure shall be as airtight as conditions permit including the provision of a double overlapping flap at the entrance. The floor of the work area shall be a layer of 6 mil polyethylene sealed to the plastic walls of the enclosure.
- 4.7 Apply negative pressure to the enclosure. For small enclosures, HEPA vacuums placed outside the enclosure with the nozzle placed inside can be used to create negative pressure. When a negative air unit discharges inside a building, perimeter sampling is required on a daily basis and action must be taken when the airborne levels exceed 0.01 f/cc.

5. Execution

- 5.1 To complete minor removal of asbestos containing material plaster, saturate using amended water solution, by using a pump sprayer. Do not remove the plaster until the material is thoroughly wetted to the substrate. Do not use water where electrical hazard exists.
- 5.2 When plaster material is removed, place all pieces directly into a 6 mil asbestos labeled waste bag as they are removed. Avoid dropping the material to the floor whenever possible. After bulk removal is completed, wash the exposed surface.
- 5.3 Frequently clean up dust and waste in the work area by HEPA vacuuming and placing in asbestos labeled disposal bags.
- 5.4 At completion of work, decontaminate equipment, tools and materials used in the work area by wet cleaning or HEPA vacuuming. Apply a slow drying sealer to the entire work area and allow a settling time of at least 2 hours prior to completing final air clearance sampling. (Air sampling is optional for small enclosures but is recommended.)
- 5.5 Before leaving the work area, decontaminate shoes and protective clothing by using HEPA vacuum or damp wiping. When protective clothing is to be disposed of, it shall be decontaminated as above and placed in labeled disposal bags. Workers shall vacuum all exposed skin, suit, respirator and proceed to wash station to wash hands and face.
- 5.6 Dispose of drop sheets and enclosures by carefully folding into asbestos labeled waste bags. Do not reuse polyethylene.
- 5.7 Before leaving area, HEPA vacuum area again and inspect areas for any loose dust and debris. Re-clean as required.
- 5.8 Dispose of waste as per waste disposal procedure.

4.2C Category 3 High Risk Work

Involves possible exposure to friable asbestos over long periods of time or work that generates high levels of asbestos. Included in category 3 work are removal projects where relatively large amounts of asbestos are removed from a building including removal of friable asbestos from structural material, cleaning or removal of heating or air handling equipment that has been insulated with asbestos. Also included in category 3 work are cuttings or grinding of asbestos-containing materials using power tools.

At St. Francis Xavier University, category 3 work is at present normally contracted to external contractors.

5.0 Asbestos Inventory and Identification

5.1 Asbestos Inventory

St. Francis Xavier University will prepare an electronic inventory of the type and locations of asbestos-containing material to:

1. Enable the material to be inspected on a regular basis to determine its condition.
2. Provide for ongoing maintenance and repair of damaged asbestos-containing material and required cleanup of asbestos-containing debris.
3. Identify asbestos-containing material (sprayed fireproofing, texture coating, or thermal Insulation.)
4. Identify the location of the material.
5. Identify when it has been sampled, the type and percentage of asbestos present.
6. Identify sampling results. Show the absence of asbestos in material which might be mistaken for an asbestos containing material.

5.1.1 Additional survey work will continue to be undertaken from time to time which will likely identify new locations where asbestos is present. For such reasons, for some years to come, the inventory will need to be considered as work in progress.

5.1.2 Copies of the written inventory can be provided upon request by Facilities Management.

5.2 Asbestos Identification

An asbestos identification process is currently under development.

5.3 Asbestos Sampling

Representative number of bulk samples” means collecting bulk samples of suspect asbestos containing material at a number of selected locations in order to give confidence to analyses and confirmation of asbestos content. If one sample contains asbestos, then no other samples are needed to prove that the material contains asbestos. (See table)

Bulk Material Samples		
Type of Material	Size of area of homogeneous material	Minimum number of bulk material sample to be collected
Surface material, including but not limited to material that is applied by spraying, troweling or otherwise, such as acoustical plaster on ceiling, and fireproofing materials on structural members	Less than 90 square metres (<1000 ft ²)	3
	90 square metres, but less than 450 square metres (1000-5000 ft ²)	5
	450 or more square metres (>5000 ft ²)	7
Thermal insulation, except thermal insulation that has been sprayed or troweled.	Any size	3
	Less than 2 linear metres or 0.5 square metres	1
Other material	Any Size	3

Asbestos containing material means a material identified by an appropriate laboratory analytical method (e.g. EPA 600/R-93/116, NIOSH 9000, or NIOSH 9002) to contain at least 0.5% of any type of asbestos, and vermiculite that is identified to contain any amount of asbestos using EPA method 600/R if other analytical methods do not identify the presence of asbestos.

6.0 Inspection

Inspection of the condition of friable asbestos is integrated into Facilities Management's routine inspection program. As part of weekly, monthly and annual inspection programs, Facilities Management staff inspects and report on the status of facilities and equipment in University Buildings. As part of these inspections, they are required to note damage to asbestos that might result in release of asbestos fibre. Upon receipt of such reports, Facilities Management Supervisors are responsible for ensuring that situations which could lead to significant asbestos exposure and that are identified by these inspections are promptly resolved.

Facilities Management staff encountering damaged asbestos, or material which the staff member believes might be asbestos, are required to report the situation to their immediate supervisor. The supervisor will initiate the assessment/remediation as required. Other University staff are also required to report damage including damage to asbestos.

Reports of damage should be made to the staff member's supervisor, Facilities Management or the Occupational Health and Safety Office.

7.0 Access Control

Access to mechanical and electrical rooms, service shafts, tunnels and other locations is to be restricted where asbestos may be present in unusually large amounts and where other hazards may also be present. Such areas are locked and accessible only to authorized personnel.

Where sprayed asbestos-containing fireproofing is present in a building above a false ceiling, access to the space is restricted to staff of Facilities Management, or authorized contractors. All such work must be carried out in accord with Facilities Management directions.

8.0 Repair and Maintenance of Asbestos-Containing Material

Should an employee or a contractor encounter material which is not identified and is not listed in the Asbestos Inventory and which might reasonably be expected to be asbestos, the person will stop any work which could create airborne asbestos fibre and report the discovery to their immediate supervisor. Where it is determined that friable asbestos-containing material is in a condition that could likely lead to inhalation exposure, the supervisor will immediately limit access to the location and initiate repairs, removal or encapsulation. Where there is reasonable doubt about the composition of a friable material, it will be treated as asbestos until testing demonstrates that asbestos is present at levels below 1%.

Clean-up and repair of asbestos-containing material will only be carried out by staff or external contractors who have been appropriately trained in the use of proper clean-up procedures.

In carrying out other work, staff are required to exercise care around asbestos containing material and avoid any unauthorized activities which could damage the material and potentially release asbestos fibres into the air.

When routine work is to take place in an area where asbestos is present or when the work might disturb friable asbestos, employees will be informed of the potential for exposure through a notation on the work order. If upon reviewing the work situation, the

employee believes that normal work practices do not provide an adequate measure of safety, the employee will report these concerns to their immediate supervisor. The supervisor will review the work situation and authorize any required additional precautions.

Academic and administrative units will be informed in advance when work involving asbestos is to be carried out in "public" areas of University buildings which they occupy.

9.0 Training and Education

Facilities Management employees who remove, repair or work around friable asbestos and those whose work might disturb friable asbestos-containing material will be trained to carry out their work without endangering themselves, their co-workers or other building occupants.

9.1 Level 1 Training

Employees of Facilities Management will receive Level 1 which will acquaint them with:

- History of Asbestos and its Uses
- The Asbestos Family
- Common uses of Asbestos
- Industrial and Commercial Products
- Consumer Products

Health Effects Associated with Asbestos Exposure

- Asbestos and Smoking
- Points of Entry into the Body
- Health Effects

Personal Protection

- Training Programs
- Safe Work Procedures
- Respirator Selection
- Qualitative Fit Tests

Asbestos Regulations

- Asbestos Disposal Requirements
- Work Procedures/Industry Standards

Refresher training will be provided as required. Only those with Level 1 training will be allowed to carry out or supervise Category 1 asbestos work.

9.2 Level 2 Training

Employees of Facilities Management who carry out Category 2 work will receive training in:

- Level 1 topics
- Respirator Fitting, Inspection, Cleaning and Disinfection
- Glove Bag Work Procedures

Refresher training will be provided every two years. Except for actual asbestos removal, only those with Level 2 training will be allowed to carry out or supervise Category 2 asbestos work.

9.3 Level 3 Training

Facilities Management employees will not receive Level 3 training at this time. This scope of work will be contracted out to external firms.

10.0 Work Contracted to External Firms

10.1 Asbestos Removal Work

Major asbestos removal is normally contracted to external firms who specialize in asbestos removal work. St. Francis Xavier University requires that all such work be carried out in accord with the requirements established by the Nova Scotia Department of Labour and Advanced Education and that all people employed in these projects be fully trained and use the protective equipment required.

At all such projects the contractor will ensure that clean-up is properly completed and that all asbestos and asbestos contaminated material is collected, and disposed of in accord with the Nova Scotia Department of Labour and Advanced Education regulations. The contractor will be required to submit air testing results to demonstrate that the clean-up has been carried out properly and the area can be re-occupied safely.

10.2 Other Contracted Work

St. Francis Xavier University often employs contractors to service equipment such as elevators, telephones, refrigeration, air conditioning and audio-visual equipment to carry out other construction and renovation projects.

When contractors are required to work in areas where asbestos is present or there is a possibility of disrupting friable asbestos St. Francis Xavier University will provide:

- Notification of the known locations and types of asbestos present (or suspected to be present) in the area where the contractor will work.
- Information on the University's asbestos inventory identification.

St. Francis Xavier University requires that contractors carrying out tasks which could potentially create asbestos-containing dust to:

- Follow work practices that reduce the creation of airborne asbestos dust and which meet the asbestos safety standards set by the Nova Scotia Departments of Labour and Workforce Development;
- Immediately report to Facilities Management when damage occurs to asbestos-containing materials;
- Employ only workers who have been trained in asbestos safety.

11.0 Disposal of Asbestos-Containing Waste

In Nova Scotia, disposal of asbestos and asbestos contaminated material is regulated by the Department of Environment under the Waste Asbestos Disposal Regulations. All waste asbestos and material contaminated with asbestos created by St. Francis Xavier University activities must be disposed of in accord with these regulations.

12.0 Respirator Fitting, Inspection, Cleaning and Disinfection

Warning: This respirator does not supply oxygen. It must not be used in oxygen deficient atmospheres (less than 19.5%); in poorly ventilated areas or enclosed spaces such as tanks or small rooms; for abrasive blasting or firefighting; or for protection against contaminants excluded or not covered by the applicable approval label.

Respiratory protection must comply with CSA Standard Z94.4 "Selection, Use and Care of Respirators".

12.1 Respirator Fitting

12.1.1 Persons required to wear respirators must first pass a qualitative fit-test administered according to the current version of CSA standard Z-94.4. The fit test should be repeated yearly.

12.2 Inspection Items Prior to Each Use:

12.2.1 Examine face piece for:

- dirt
- cracks, tears or holes
- distortion and flexibility
- crack or breaks in filter holders, worn threads and missing gaskets

12.2.2 Examine valves for:

- detergent residue, dust or other material on valves or valve seals
- cracks, tears or distortion in the valve material
- missing or defective valves or valve covers

12.2.3 Examine filter for:

- proper filter for protection against asbestos (P100 high efficiency particulate)
- incorrect installation, loose connections, missing or worn gaskets or cross threading
- cracks or dents in filter housing

12.2.4 Leak checks: Perform the following tests on each donning

- negative pressure test: cover inlets to filters, breathe in and hold breath; respirator should be drawn to face for minimum of 10 seconds (if not, check exhalation valve and fit)
- positive pressure test: cover exhalation valve cover and puff out slightly and hold breath; respirator should slightly pressurize and still hold seal (If not, check inhalation valves and fit)

12.3 Respirator Cleaning and Disinfection

12.3.1 Remove filters and disassemble face piece. Discard or repair defective parts.

12.3.2 Wash components in warm water with mild detergent using a brush. Cleaning and disinfectant solutions are available from respirator manufacturers.

12.3.3 Thoroughly rinse components in clean, warm water.

12.3.4 Air dry or hand dry components with a clean, lint-free cloth.

12.3.5 Reassemble respirator and test to ensure that all components are working properly (see above). Be careful to check that valves are not lost in the cleaning.

12.4. Filter Cartridge Handling and Replacement

12.4.1 Filters can be reused until an increase in breathing resistance is noted. Under typical Type 2 condition, filter cartridges should last a minimum of 24 hrs (continuous use). Inlet side of filter cartridge to be reused shall be sealed on the inlet side with tape for storage.

12.4.2 When no longer usable, filter cartridges will be sealed on the inlet side with tape and disposed of as asbestos contaminated waste.

13.0 Glove Bag Work Procedures

The following procedures will be followed when single-use asbestos removal glove bags are used. The procedures may only be used on tasks that are small enough to be completely enclosed in the glove bag and which do not leave exposed asbestos when bag is removed.

1. Equipment

Equipment required for the work must be on-site before proceeding.

Note: These procedures are primarily based on the use of single use asbestos removal glove bags. It should be understood that they are for use at one location only, and cannot be moved or used elsewhere.

Note: If single use polyethylene glove bag is used in Section 4 Execution, it shall be replaced by manufacturer's recommended procedures.

1.1 Vacuum

An asbestos approved vacuum(s) (HEPA filtered), equipped with brushes, fittings, etc. Vacuum(s) must not be opened within the facility. The vacuum(s) exterior shall be carefully wet cleaned after work is completed. A HEPA filter is at least 99.97% efficient in collecting a 0.3 micrometer particle and approved for clean up of hazardous materials. The HEPA vacuum must not be opened on-site unless Type 2 work procedures are followed or in a laboratory exhaust hood.

1.2 Respirators

Workers within the work area shall wear approved respirators. Respirators shall be a half-face piece respirator with high efficiency filters (P100). See section 12.0

Respirators shall be kept in position throughout the entire time the worker is in the area of the work, from the first disturbance of asbestos containing material, until the final cleaning of the area and removal of waste is completed. Change filters after 24 hours of cumulative wear or sooner if breathing resistance increases.

1.3 Protective Clothing

All workers shall wear disposable coveralls with attached hood. Coveralls should be worn with the hood in place at all time. Coveralls may be vacuumed or wet wiped clean for re-use, for a maximum of 8 hours cumulative wear. Suit and head cover shall remain in place until worker leaves work area. Boot covers or dedicated boots are recommended. Disposable clothing and respirator filters will be disposed of as asbestos waste.

1.4 Glove Bag

Prefabricated, 0.25 mm (10 mil) minimum thickness polyvinyl-chloride bag with integral 0.25 mm (10 ml) thick polyvinyl-chloride gloves and elasticized port. The bag must be sized for insulation to be removed. The bag must be disposed of once filled. Bag shall not be emptied and reused.

1.5 Securing Glove Bag

Use duct tape to secure the ends of the glove bag around pipe and/or insulation.

1.6 Water Sprayer

Garden reservoir type, low velocity, capable of producing mist or fine spray with water-containing wetting agent. Wetting agent shall be diluted as per manufacturer's recommendations.

1.7 Other Equipment

- plastic sheet (4 mil polyethylene) - to cover exposed or damaged section of pipe prior to attaching glove bag
- duct tape - to seal asbestos waste bags, fasten plastic to pipe, if required
- labeled asbestos waste bags (6 mil) - for waste from small pieces of debris, disposable suits, used polyethylene, etc.
- wire saw - saw with flexible serrated wire blade and handles to allow use inside glove bag
- knife with fully retractable blade for use inside glove bag

- asbestos warning signs
- cleaning supplies e.g., scouring pads, sponges, brushes, etc.
- encapsulating sealer

2. Other Protective Measures

2.1 Do not eat, drink or smoke in the work area.

2.2 On completing clean-up of work area, use vacuum and wet cloth (with clean potable water) to clean hands, face, respirator, and boots. Remove protective equipment and proceed to nearest wash station to wash exposed skin on hands and face.

3. Preparation

3.1 Prior to the start of the project, ensure the work area is un-occupied and asbestos warning signs are posted in the appropriate areas.

3.2 Where practical, clear area below pipe of moveable furnishings or equipment. Provide scaffold as required to reach pipe.

3.3 Post an asbestos warning sign at all entrances to room in which the procedure is being used. If necessary use rope or tape barriers to separate work area.

3.4 Segregate the area of asbestos work from other parts of the building required to remain in use by using polyethylene walls or barrier tape.

3.5 Shut off and seal all diffusers, vents and other openings to ventilation and exhaust systems in the room with polyethylene secured with tape.

3.5 Cover all items or equipment located in the designated work area with polyethylene when items or equipment cannot be cleaned in case of a spill. Tape the polyethylene in place. The polyethylene should cover a width equal to the height of the pipe from the floor, with a minimum width of 3.6 m (12 feet), where required.

3.7 Seal all openings and voids in the vicinity of the glove bag operation with one layer of polyethylene secured with tape.

3.8 Check condition of pipe insulation where work will be performed. If the pipe insulation has minor isolated damage, mist surface and patch with tape. If damage is more extensive, wrap pipe with plastic and "candy stripe" it with duct tape first. If pipe insulation is severely damaged and cannot be simply repaired, glove bag is not appropriate. (Use Type 2 Procedures.)

3.9 Pre-clean with HEPA vacuum or wet methods any loose material on surface of pipe or any material on the floor. If significant amount of material is on floor, Type 2 procedures may be required for clean-up.

3.10 Place necessary tools in bottom of glove bag.

4 Execution

4.1 Place the bag onto the pipe and seal each end to the pipe with duct tape. Do not pull the bag tightly to the ends - a small amount of slack allows better room to work within the bag.

4.2 Place hands into gloves and use necessary tools (wire saw, utility knife, wire cutters) to remove insulation from pipe. Arrange insulation in bottom of bag to obtain full capacity of bag. Roll metal jacketing carefully to minimize ripping or puncturing of the bag.

4.3 When removal is complete or bag is full, insert nozzle of spray pump into bag through valve and wash pipe and interior of upper section of bag thoroughly. Use one hand to aid washing process. Wet surface of insulation in lower section of bag and any exposed ends of asbestos insulation remaining on pipe.

4.4 Prior to removing bag from the pipe, wash the top section of the bag and tools thoroughly. Insert nozzle of HEPA filtered vacuum into bag through the valve and evacuate air from bag. Seal the asbestos waste at the bottom of the bag using duct tape. Spray a mist of encapsulating sealer and allow to set up undisturbed for approximately 15 minutes. Place tools in one glove, pull hand out inverted, twist to create a separate pouch, tape inside-out glove at two separate locations 1" apart to seal pouch. Remove inside-out glove and tools by cutting between the tape seals. Remove the vacuum nozzle and pump sprayer nozzle.

4.5 The tools will then be removed by cutting through the duct tape ensuring that both the bag and the glove remained sealed. If tools are to be used again, place the sealed 'glove' into new glove bag. If work is completed, submerge the sealed 'glove' in water and open. The tools will be cleaned under water.

4.6 Prior to disposal of bag, evacuate the bag with a HEPA vacuum. Pull a labeled asbestos waste (6 mil) bag over glove bag before removing from pipe. Remove securing duct tape and carefully place glove bag in the labeled asbestos waste bag and seal.

4.7 If during use the glove bag is ripped, cut or opened in any way, cease work and repair opening before continuing work. All spilled material must be cleaned up and removed with a HEPA vacuum or wet cleaning.

- 4.8 After removal of bag ensure pipe is clean of all residue. If necessary, after removal of each section of asbestos, vacuum all surfaces of pipe, using HEPA filtered vacuum equipment, or wipe with wet cloth.
- 4.9 Seal all surfaces of freshly-exposed pipe with encapsulating sealer to tack down any residual dust. Cover exposed ends of any remaining asbestos insulation with lagging cloth or tape.
- 4.9 Before leaving work area, a worker shall decontaminate shoes and protective clothing by using HEPA vacuum or damp wiping. When protective clothing is to be disposed of, it shall be decontaminated as above and placed in labeled disposal bags. Workers shall vacuum all exposed skin, suit, respirator and hair (after removing hood) and proceed to nearest washroom to wash hands and face.
- 4.11 Dispose of waste as per waste disposal procedures.

14.0 ASBESTOS SAFE WORK PROCEDURES

14.1 Discovering Damaged Asbestos

When asbestos is discovered on campus facilities the following steps describe the actions to be taken by trades staff and their supervisors. The steps comply with Facilities Management's Asbestos Policy, which states the long term goal is to remove all asbestos on campus and the short term goal is to manage asbestos to minimize exposure to airborne asbestos. It is important to note that all asbestos is to be logged in the inventory, regardless of its state of repair.

1. The employee is to notify their immediate supervisor of their concern regarding possible asbestos damage materials.
2. Sampling - The Supervisor will determine if samples are required to confirm the existence of asbestos. This will be done by checking the inventory to see if asbestos in that location has already been tested. If necessary, the Supervisor will close off an area (mechanical spaces) or shut down equipment (air handling units) pending test results and remedial action.
3. Repair/Removal and Clean-up - If the asbestos is damaged, it is certain a clean-up will be required. The clean up and repair should happen together. Proper methods should be followed, as outlined in 12.1.2 (Clean up of Asbestos Containing Material). If removal is required, the supervisor will determine whether the removal will be carried out by a contractor or by Facilities Management staff.

4. Labeling - All known asbestos containing material should be labeled as per St. Francis Xavier University labeling procedures which are currently under development.

5. Logging in Database Facilities Management Supervisors will log asbestos containing material information into the Asbestos database.

14.2 Clean up of Asbestos Containing Material

Asbestos only poses a health hazard when it becomes airborne and people inhale the fibre. When asbestos-containing material has been disturbed, effective clean up will ensure that asbestos does not present a health hazard. Clean up of dust which might contain traces of asbestos, such as a custodian might encounter in routine cleaning in buildings where asbestos is present, will not require special precautions. To ensure that clean up of significant quantities of asbestos will not expose staff to airborne asbestos fibre, the following procedure will be followed:

1. Clean-up of significant amounts of asbestos containing material will only be done by staff who have been trained and who are wearing appropriate protective clothing and a fitted, air-purifying respirator.
2. Dry sweeping of asbestos-containing waste or other clean up activities which will create airborne dust **is not permitted**.
3. Large pieces of asbestos containing material will be collected by hand and properly bagged in accord with the disposal procedure.
4. Whenever possible, asbestos dust will be thoroughly wetted and cleaned up with a wet mop or a wet vacuum, contaminated water will be discharged to a sewer. Containers, mops and other equipment which might be contaminated with asbestos will be rinsed with water and the rinse water discharged to a sewer.
5. If additional clean up is needed it will be carried out using a vacuum equipped with a HEPA filter. Within Facilities Management there is one vacuum assigned for asbestos clean up. It is labeled as **ASBESTOS ONLY** and is stored on the basement level of facilities management building.

14.3 Work with Non-friable Asbestos Containing Materials

Asbestos that is effectively bonded in a non-asbestos matrix cannot easily become airborne. As such, provided the material is not broken or abraded, there is little risk of inhalation exposure to asbestos. To ensure that minor work involving non-friable asbestos; including vinyl asbestos tile, asbestos asphalt roofing, asbestos ceiling and wall tile, the following procedures will be followed;

1. Before beginning the work the worker will carefully inspect the asbestos- containing material to ensure that the planned work will not create airborne asbestos dust.
2. Where dust that might contain asbestos fibre is present, the worker will clean the material using a wet method or a HEPA filtered vacuum.
3. Following completion of the task the worker will carry out any required clean wet methods or a HEPA filtered vacuum and will then carefully bag for disposal all asbestos containing waste.

Note:

Cutting, drilling, sanding or breaking the material are likely to create airborne asbestos dusts and will require additional precautions.

14.4 Work above False Ceilings Where Asbestos Insulation is Present on Building Structure

Only workers who have successfully completed Level 2 Asbestos Safety Training and who are authorized to do so by Facilities Management may move ceiling tiles or perform work above the dropped ceilings where asbestos insulation is present on building structure. The following procedures shall be used whenever minor work such as installation of telephone or computer lines, or servicing of ventilation or lighting system components requires work above the suspended ceiling:

- 1 Before removing a ceiling tile, the area around the tile shall be isolated by creating an enclosure of 4 mil or heavier polyethylene sheeting. The sheeting shall be taped to the ceiling t-bar and the floor using duct tape.
2. Those working within the enclosure shall wear a properly fitted, air purifying respirator equipped with a particulate filter designed to remove asbestos fibres from inhaled air and a pair of coveralls.
3. Air supply or return grills located within the enclosure shall be sealed with 4 mil or thicker polyethylene sheeting to prevent contamination of the ventilation system.

4. The ceiling tile shall be carefully removed and the upper surface vacuumed with a vacuum fitted with a HEPA filter.
5. The worker shall then carefully vacuum the upper surface of surrounding tiles before carrying out the assigned task.

Following completion of the above-the-ceiling work, the removed ceiling tile shall be replaced and the interior of the enclosure carefully cleaned using wet cleaning techniques or a HEPA filtered vacuum.

Note: Additional precautions may be required depending upon the specific tasks to be undertaken. Any task, which is likely to disrupt the sprayed-on insulation, will require additional precautions.

14.5 Repairs to Asbestos Containing Insulation

Where asbestos is known or believed to be present in damaged insulation, repairs or removal are needed to prevent asbestos fibre from becoming airborne. Only workers who have successfully completed Level 3 Asbestos Safety training and who are authorized to do so may undertake such repairs or removal. The following procedures will be used whenever minor repairs to asbestos containing insulation is undertaken:

Access to areas where minor repair is to be carried out will be restricted to authorized people only. When necessary, signs will be posted advising of access restrictions.

1. Workers repairing asbestos containing insulation will wear coveralls and a properly fitted, air purifying respirator equipped with a particulate filter designed to remove asbestos fibres from inhaled air.
2. Before beginning the repair, the area will be carefully cleaned using the Clean up of Asbestos-Containing Material Procedure (12.1.2).
3. When feasible a drop cloth shall then be placed beneath the insulation to be repaired.
4. Before beginning the repair, all feasible steps (wetting with amended water, encapsulating adjacent asbestos-containing material, etc.) will be taken to prevent the release of asbestos fibres.
5. Following the repair the worker will carefully bag for disposal all asbestos- containing waste and clean the surrounding area using wet cleaning techniques or a HEPA filtered vacuum.

14.6 Minor Repairs to Asbestos-Containing Plastered Ceilings and Walls

Plastered walls and ceilings in several University buildings may contain 3% - 5% chrysotile asbestos. In an undamaged state the asbestos fibre is effectively trapped in the plaster and, as a result, the fibre cannot become airborne. However, during repairs to the plaster, it is possible to create dust from the base coat, which might release fibres into the air. In order to prevent potentially harmful exposures to airborne asbestos fibres, the following procedures will be followed by all those performing minor repairs to plaster wall and ceilings in buildings:

1. Supervisor shall ensure that building occupants have been notified that work will be carried out.
2. No personnel, other than those performing repairs, will be present in the space during repairs.
3. Remove to another room any furniture or equipment that is easily relocated.
4. Cover or wrap in plastic any remaining furniture and equipment.
5. Close the floor to the room.
6. Set up negative air unit with HEPA filter to draw air from room and vent filtered air outside. This practice will create a negative air pressure in the room so taping the door is not necessary.
7. Performance of Work Causing Airborne Asbestos. While wearing disposable coveralls and a fitted, air purifying respirator (3M 6000 Series purple 6240 particulate filter or equivalent) complete the work.

14.6.a Clean-up:

1. Using a HEPA filtered shop vacuum (labeled "Asbestos Only") clean room thoroughly.
2. Wrap up plastic and dispose of in appropriate bag.
3. If this is the last procedure of the work order, place filters and disposable coveralls in bag.
4. Ensure bag containing contaminated materials is disposed of in accord with procedure 12.1.10 of the St. Francis Xavier Asbestos Management Plan.
5. Clean negative air unit

Note: Additional precautions may be required depending upon the specifics of the tasks to be undertaken. Major repairs or activities which will create substantial quantities of dust will require additional precautions.

14.7 Single Use Glove Bag Procedure

The following procedures will be followed when single-use asbestos removal glove bags are used. The procedures may only be used on tasks that are small enough to be completely enclosed in the glove bag and which do not leave exposed asbestos in place when the bag is removed.

14.7.a Preparation:

1. Only a staff member who has completed level 3 training and who is wearing appropriate coverall and an air purifying respirator (3M 6000 Series with a purple, 6240 particulate filter or equivalent) will carry out glove bag removal of asbestos.
2. Before beginning removal work, access to the area will be restricted. If the work site is located in areas where other Facilities Management staff might be exposed to asbestos and in all work sites located in publicly accessible areas, warning notices will be posted.
3. Steps will be taken to prevent accidental movement, contact with heat, cold or electricity, or release of chemicals.
4. The work area will be cleaned using a HEPA filtered vacuum or wet cleaning to remove asbestos-containing material contaminating the immediate work area. Where possible a plastic sheet will then be placed beneath the pipe or fitting from which the asbestos is to be removed.
5. Steps will be taken to prevent exposure where damage to the insulation might allow release of fibres. Steps include making temporary repairs using duck tape or wetting the exposed fibre using amended water.

14.7.b Glove Bag Removal:

1. The asbestos-containing material will be thoroughly wetted using amended water.
2. With tools in bag, the single-use bag will be positioned and secured using adhesive and tape as necessary.
3. Working through the gloves, the asbestos will be removed exercising care to avoid puncturing the bag.

4. When removal is complete or bag is full, sprayer (containing amended water) will be inserted into the bag and the pipe or fitting, tools and the bag interior will be washed. Tools will then be placed in an inverted glove withdrawn from bag and the glove sealed from the bag using duct tape.
5. The tools will then be removed by cutting through the duct tape ensuring that both the bag and the glove remain sealed.
6. The tools will then be submerged in water and the glove opened. Tools will be cleaned under water.
7. The glove bag will then be carefully removed, sealed and placed in a sealed container pending packaging for disposal.

14.7.c Clean Up:

1. The surface of the pipe or fitting will be carefully wet wiped and treated with sealer.
2. The plastic sheet will then be carefully wet wiped and rolled up.
3. All solid waste created during removal jobs including glove bags, disposable coveralls, wipe rags and plastic sheeting will be treated as asbestos containing waste and handled as detailed in the disposal procedure.

14.8 Multiple-Use Glove Bag Procedure

This procedure describes the use of multiple use glove bags. It may be used on tasks that require the bag to be repositioned to complete the entire job.

14.8.a Preparation:

1. Only a staff member who has completed level 3 training and who is wearing appropriate coverall and an air purifying respirator (3M 6000 Series with a purple, 6240 particulate filter or equivalent) will carry out glove bag removal of asbestos.
2. Before beginning removal work, access to the area will be restricted. If the work site is located in areas where other Facilities Management staff might be exposed to asbestos and in all work sites located in publicly accessible areas, warning notices will be posted.
3. Steps will be taken to prevent accidental movement, contact with heat, cold or electricity, or release of chemicals.

4. The work area will be cleaned using a HEPA filtered vacuum or wet cleaning to remove asbestos-containing material contaminating the immediate work area. Where possible a plastic sheet will then be placed beneath the pipe or fitting from which the asbestos is to be removed.

5. Steps will be taken to prevent exposure where damage to the insulation might allow release of fibres. Steps include making temporary repairs using duck tape or wetting the exposed fibre using amended water.

14.8.b Glove Bag Removal:

1. The asbestos containing material will be thoroughly wetted using amended water.

2. With tools in bag, the bag will be positioned and secured using adhesive and tape as necessary.

3. Working through the gloves, the asbestos will be removed exercising care to avoid puncturing the bag.

4. When removal is complete or bag is full, sprayer (containing amended water) will be connected to the valve and the pipe or fitting, tools and the bag interior will be washed. If the bag is to be repositioned to remove additional asbestos, remaining exposed ends of asbestos will be thoroughly damped.

1. Tools will then be placed in an inverted glove withdrawn from bag and the glove sealed from the bag using duct tape.

2. The tools will then be removed by cutting through the duct tape ensuring that both the bag and the glove remain sealed.

3. The tools will then be submerged in water and the glove opened. Tools will be cleaned under water.

4. The glove bag will then be removed and placed in a sealed container pending packaging for disposal.

14.8.c Clean Up:

1. The surface of the pipe or fitting will be carefully wet wiped and treated with sealer.

2. The plastic sheet will then be carefully wet wiped and rolled up.

3. All solid waste created during removal jobs including glove bags, disposable coveralls, wipe rags and plastic sheeting will be treated as asbestos containing waste and handled as detailed in the disposal procedure.

14.9 Modified Enclosure Procedure

The following Modified Enclosure Method may be used for removal of asbestos from ceilings, walls, beams pipes or other equipment providing that the job is small enough that it can be completed within one shift without the need for repeated entry into the work area.

The method may not be used for jobs involving:

- Amosite
- Crocidolite or
- Friable asbestos of any type.

Additional precautions will be required if the exhaust air cannot be discharged outdoors. Modified enclosure removals may only be undertaken by staff who have completed level three training and who have received modified enclosure removal training.

14.9.a Preparation:

1. If dust which might contain asbestos is present, pre-clean the work site using wet cleaning or HEPA vacuum cleaning.
2. Protect floor, walls equipment within the work area which might be damaged by water.
3. Ensure that steps are taken to protect workers from any energized equipment or systems located within the work area.
4. Post signs and restrict access to work area.
5. Seal area to prevent air leakage into adjacent areas or air handling system using framing as necessary, 150 mil plastic sheeting, tape, sealants and caulking as required. Construct an overlapping, double curtained entrance to work area.
6. Install HEPA filtered negative air unit in work area. Unit must provide 4 air changes per hour while maintaining a pressure difference of -0.02 inches of water.
7. Direct filtered exhaust air outdoors.

14.9.b Removal:

1. Staff entering the work area shall wear a disposable Tyvek type suit including a head cover and an air purifying respirator (3M 6000 Series with a purple, 6240 particulate filter or equivalent).
2. With the area sealed and negative air unit in operation, saturate asbestos-containing material with amended water using airless sprayer.
3. Remove asbestos using additional amended water as needed being careful not to create airborne dust.
4. Brush the area from which asbestos has been removed and then wet wipe or vacuum to remove final traces of asbestos. Following removal of asbestos, treat the area with slow dry sealer.

14.9 Clean up:

1. Place all waste in specially marked heavy duty asbestos waste disposal bags. Seal waste bags securely using duct tape before removing from the enclosure. Wipe tools with a damp cloth to remove traces of asbestos contamination before removing them from the enclosure.
2. Wet wipe or vacuum (using the designated shop vacuum marked **ASBESTOS ONLY** which is stored in the basement of Facilities Management) all areas within the enclosure not covered by plastic to remove traces of asbestos.
3. If a HEPA filtered shop vac was used, it shall be wiped with a damp cloth and the hose end covered with tape before being removed from the enclosure. If the vac is to be opened to change a filter or bag, the work will be carried out in an enclosure under negative pressure with HEPA filtered air exhausted outdoors.
4. Wet wipe the interior of plastic sheeting used to form the enclosure. Remove plastic by rolling, wet wiping any visible particulate matter that may be visible. Wet wipe the disposable Tyvek suit and remove. Place the plastic sheeting, the suit and the used respirator cartridges in an asbestos waste bag along with other remaining contaminated material.
5. Arrange for re-connection of any services running through the work area which were disconnected to accommodate removal work.
6. Dispose of waste as per waste disposal procedure.

14.10 Disposal of Asbestos Containing Waste Materials

Handling and disposal of asbestos containing waste is regulated by both the NS Departments of Environment and Labour. To ensure compliance with these regulations and to ensure that no-one is exposed to asbestos the following procedure is to be followed:

1. Only a staff member who has completed Level 2 training and who is wearing appropriate air purifying respirator will package asbestos waste.
2. Waste asbestos will be thoroughly wetted and then placed in specially labeled 6 mil plastic bags. The bag will be securely sealed using duct tape. The bagged asbestos will then be placed in a second, labeled 6 mil plastic gab bag which is again taped closed.
3. Asbestos waste may be transported from the location where it was produced to an interim storage location if the bags are free from punctures or tears and if the outside of the bag is free of asbestos. Asbestos waste will be transported in an enclosed vehicle or beneath a secured tarpaulin. No other cargo may be carried while the waste asbestos is being moved. After the waste asbestos is moved to an interim storage site, the driver will, if necessary clean the vehicle to remove asbestos contamination.
4. Asbestos waste must be disposed of at a waste disposal site which is approved to receive asbestos by the Nova Scotia Department of Labour and Advanced Education. Shipment of waste asbestos must be coordinated with the waste disposal site which is to receive the waste. Asbestos disposal will normally be carried out by external contractors.
5. Shipments for disposal must be done in accord with the Transportation of Dangerous Goods Act and must be accompanied by a properly completed shipping document.

Asbestos for disposal will be carried within enclosed vehicle or covered with a secured tarpaulin. The vehicle will also carry a broom, shovel, respirator, protective clothing, wetting agent and plastic bags for use in the event of a spill or a leak.