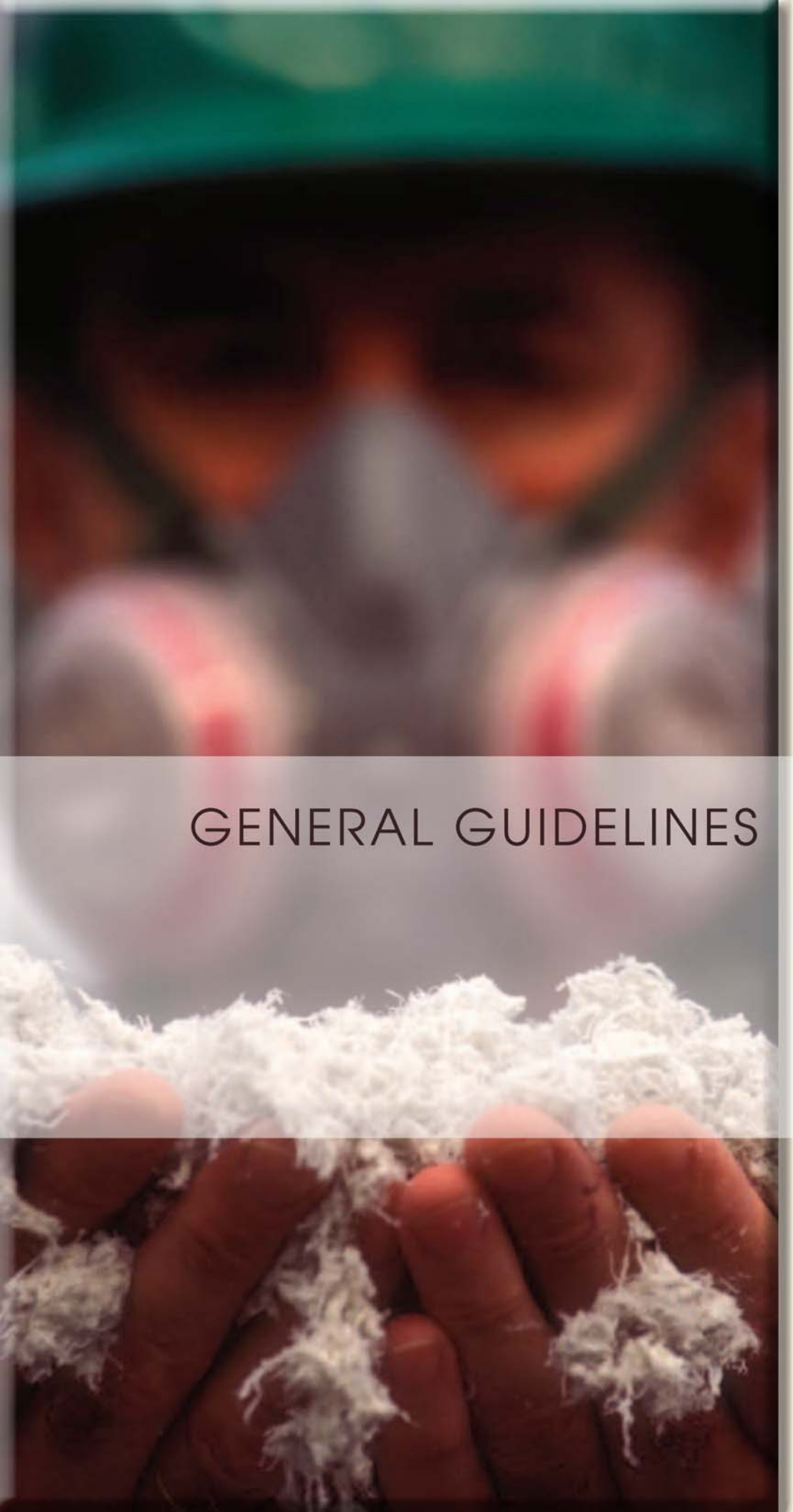

Please also refer to WSCC's Asbestos Abatement Code of Practice

GENERAL GUIDELINES

ASBESTOS REMOVAL AND DISPOSAL

Northwest Territories Public Works and Services

GENERAL GUIDELINES

ASBESTOS REMOVAL AND DISPOSAL

Northwest Territories Public Works and Services

Table of Contents

Executive Summary

Executive Summary

This document describes various types of asbestos, situations in which asbestos is likely to be encountered, health hazards, legislation, and requirements for safe asbestos removal, including monitoring, air testing, personal hygiene, waste disposal, and cleanup.

Asbestos is a fibrous mineral commonly used as a component in many materials because of its strength and heat-resistant properties. It was widely used in a variety of building materials until 1987. All types of asbestos have been confirmed to cause cancer. Inhalation of asbestos fibres may result in asbestosis, a progressive fibrosis of lung tissue or mesothelioma. Diseases caused by asbestos may not manifest themselves for 15 to 50 years after exposure.

Most asbestos in Canada is used to manufacture asbestos cement sheeting. Lesser amounts of asbestos are used for insulation around boilers and piping. Asbestos release occurs when the material has been damaged or when buildings are being demolished.

In the NWT, the Asbestos Safety Regulations establishes requirements for working with asbestos-containing materials (ACM). The Worker's Safety and Compensation Commission (WSCC) has set exposure limits for workers. PWS has completed an inventory of PWS assets containing asbestos and has implemented an Asbestos Management Program, which describes the steps to be taken when dealing with asbestos in a building.

Special precautions need to be taken to ensure the protection of both workers and building occupants when removing asbestos from a building. Sampling is required, and depending on the type of asbestos, extensive measures for asbestos removal may be required.

All forms of asbestos should be handled only by persons having the appropriate training (recognised by the authority having jurisdiction) and wearing the appropriate Personal Protective Equipment. Workers handling friable asbestos must wear disposable full body protection suits and respirators with the correct filters, gloves, boots, etc. A decontamination unit may be required to ensure a negative pressure in the work area. Wetting agents will be needed to ensure asbestos release is minimized.

Asbestos must be disposed of in a registered secure landfill, in accordance with regulatory requirements.

GLOSSARY OF TERMS

Amended Water	water to which a wetting agent has been added
Analysis Contractor	contractor qualified to test and determine composition of samples
Approved	approved by an officer appointed under the *Safety Act*
Asbestos	any of the following fibrous silicates: chrysotile, amosite, crocidolite, actinolite, anthophyllite, or tremolite
Asbestos-Containing Material (ACM)	material that contains 1% or more by volume of most asbestos types
Building	includes a structure, and its electrical, plumbing, heating and air handling equipment and rigid duct work

Competent

1. qualified, because of knowledge, training and experience, to do assigned work in a way that will ensure the health and safety of people,
2. knows the details of the *Act* and the regulations that apply to the assigned work, and
3. knows about potential or actual danger to health or safety connected with the assigned work

Class 1	Low risk Asbestos procedures and minor removal tasks described in Section 9
Class 2	Medium risk Asbestos procedures and removal tasks described in Section 10
Class 3	Higher risk Asbestos procedures and removal tasks described in Section 11

Contractor Notification	a form in PW&S Asbestos Management Plan that verifies that a contractor has been made aware of possible ACM in the building.

Department	the Department of Public Works and Services (GNWT)
Fibre	means a fibre of asbestos that is more than five micrometers in length and that has a length to-width ratio of not less than three to one as viewed in a phase-contrast optical microscope at four to five hundred magnification
Fibre/cc of air	means fibres of asbestos per cubic centimeter
Friable Material	material that, when dry, can be or has been crumbled, powdered, or pulverized by hand pressure and is readily moved in the air
HEPA Filter	a High Efficiency Particulate Aerosol filter that is at least 99.97 per cent efficient in collecting a 0.3 micrometer aerosol
NIOSH	National Institute of Occupational Safety and Health (USA)
Officer	means an occupational health and safety officer appointed under the *Safety Act*
PW&S	the Department of Public Works and Services, GNWT
Waste Material	any removed asbestos-containing material not intended for reuse and asbestos-contaminated material that cannot be cleaned adequately for reuse. Includes disposable clothing and personal protective equipment
WSCC	the Workers Safety and Compensation Commission of the NWT and Nunavut
Wetting Agent	means any product that when added to water will lower the water viscosity and help to penetrate the asbestos material.

1.0 INTRODUCTION

1.0 Introduction

The Department of Public Works and Services (PWS) maintains and operates assets throughout the Northwest Territories for the Government of the Northwest Territories (GNWT). PWS has prepared an inventory of asbestos-containing materials (ACM) and an Asbestos Management Plan for these assets. These Guidelines provide direction to PWS staff to ensure the protection of both workers and building occupants as well as compliance with regulatory requirements during projects involving ACM. Consulting these guidelines should also help to complete projects involving ACM as efficiently as possible.

Asbestos is a fibrous mineral commonly used as a component in many materials because of its strength and heat resistant properties. Asbestos was widely used in a variety of building materials until 1987. Its use was limited across Canada as a result of health concerns related to exposure to asbestos. Inhalation of asbestos fibres may result in asbestosis, a progressive fibrosis of lung tissue. Scar tissue (fibrosis) may continue to develop after exposure stops. Two forms of cancer, lung cancer and mesothelioma, may result from exposure to inhaled asbestos fibres. There may be a long latency period (between 15 to 50 years) between exposure and the development of these cancers. As little as a few weeks of exposure to high asbestos fibre levels may be enough to cause lung cancer, especially with the crocidolite and amosite forms of asbestos.

When should these guidelines be consulted?

The policy of PWS is to manage ACM in-place until removal becomes practical or necessary. Removal of ACM will occur in the following circumstances:

- ACM's have become damaged to the point where encapsulation (with paint or other products approved by best practice) is not practical and building maintenance workers and/or building occupants may be exposed.
- During renovations and before demolition of assets containing ACMs.
- When specifically requested by the client.
- Where risk assessments or annual inspections identify a hazard.

These guidelines provide assistance to PWS asset management and project staff when one or more of the above situations arise. These Removal Guidelines apply to every place where the department is mandated to provide maintenance or project management services.

Health and Safety Legislation for Asbestos in the NWT

The Asbestos Safety Regulations, issued under authority of Section 22 of the *NWT Safety Act*, establishes requirements for working with ACMs. The Workers Safety and Compensation Commission (WSCC) addresses training and safety, and enforces these regulations for workers involved in asbestos projects. The WSCC has set exposure limits, that detail how much asbestos a person can safely be exposed to. The exposure limit for any type of asbestos has been set at 0.1 fibre/cc over an 8-hour period. The United States Occupational Health and Safety Administration (OSHA) originally adopted this limit as Standard 29 CFR 1910.1001.

The limit applies to everyone. However, when an asbestos worker wears personal protective equipment that filters out asbestos fibres they are able to work in areas where a higher concentration of fibres is present.

Environmental Legislation for Asbestos in the NWT

Disposal of ACMs is controlled under the NWT Environmental Protection Act, that is administered by the Department of Environment and Natural Resources (ENR) of the GNWT. ENR has prepared the "Guideline for the Management of Waste Asbestos" to assist people wishing to dispose of ACMs in the NWT.

Key requirements of the ENR Guideline include:

A. The responsibility for proper waste management rests with the generator or owner (GNWT Department) of the asbestos.

B. The transportation of waste asbestos requires proper classification, packaging, labeling and documentation.

C. Waste asbestos can be disposed of at a local landfill with permission of the municipality (under certain conditions only) or through a registered waste management company.

The ENR Guideline provides more information. Consult it before beginning any activity requiring the removal, transportation and disposal of waste ACMs.

2.0 INSPECTION AND DETERMINATION OF THE PRESENCE OF ASBESTOS

2.0 Inspection and Determination of the Presence of Asbestos

The intent of the ACM inventory for PWS controlled assets was protection of people in their day-to-day work. Renovation and demolition may involve areas of the building not previously inspected, i.e., older flooring under carpet or added underlay, gyproc wallboard covered by previous renovations, and joint compound on existing wallboard.

The early identification of ACMs is essential for the safe and efficient completion of the project. Accordingly, check for the presence of ACMs during the early stages of the planning of the project.

- Consult the Departmental Asbestos Inventory and note the type, location and extent of any documented ACMs in the asset. Remember the Departmental Asbestos Inventory only includes ACMs that were visible during the initial survey. A more thorough investigation of all areas potentially disturbed by the project must be undertaken.
- Have a trained person (Regional Asbestos Coordinator or Consultant) survey the areas to be affected by the project for the presence of ACMs. Remember to look at all materials that may be affected by the project, such as additional layers of flooring underneath a carpet, original walls and ceilings behind current walls and ceilings, and under the current siding (in the situation where the ACM has been covered up). Document the type, location and extent of the suspected ACM.
- Obtain a sample of each type of suspected ACM for laboratory analysis. Samples can be wetted to minimize risk of fibre release (see Section 3.4).
- For rigid non-friable material such as floor or ceiling tile, get a 3 cm by 3 cm piece of the material and place it in a sealable plastic bag.
- For friable material such as boiler or pipe-elbow installation, chip or cut at least a 2 cm by 2 cm section of the material and place in a sealable plastic bag.
- Label each sample with the asset name, location, type of material and date. A chain of custody form must be completed identifying all samples.
- Tag and photograph the location where the sample was obtained so that further samples may be obtained if necessary and to enable the extent of the ACM to be determined once laboratory results have been received.
- For the project file, keep a separate record with the same information.

- Place all individually bagged samples in a larger sealable bag for shipment. Place the samples within a padded envelope or rigid container and ship to an Analysis Contractor, requesting analysis for the presence, concentration and type of asbestos in each sample. Include a copy of the chain of custody form.
- If there is a change of texture or colour in a material, take additional samples to reflect the different products. Sometimes samples contain a number of layers as part of a matrix. Inform the Analysis Contractor which part(s) of the matrix you want analyzed.
- Remember to remove potential ACM samples in a way that minimizes the risk of exposure to the person collecting the sample and to building occupants.
- Collect the samples when building occupants are not present, e.g., before or after normal working hours.
- Use adequate protection (e.g. a HEPA filter mask and gloves) when collecting samples of friable materials, pipe elbows, attic insulation, or boiler insulation.
- Minimize the release of asbestos fibres during sample collection. Use a HEPA vacuum in conjunction with sampling (directing suction onto area where active sampling is occurring to capture fibres released), or wet the surface of the ACM before obtaining the sample to reduce fibre release. Immediately transfer the sample to the sample container.
- Clean up the area where the sample was obtained immediately after sample collection to prevent release of more fibres. Use wet wipes or a HEPA vacuum for this purpose, rather than sweeping (sweeping will generate dust and fibres). Use duct tape or some other material to seal disturbed areas. Decontaminate sampling equipment and any parts of your body exposed to the potential ACM with thorough washing with water.
- The results of the laboratory analysis are usually available within 5-7 working days after the lab receives the sample. Materials with less than 1% asbestos content are normally considered non-ACMs unless the type of asbestos is a concern. Use the information from the existing inventory and the survey document to determine the presence and extent of ACMs in the asset. Give this information to the Regional Asbestos Coordinator to update the Asbestos Inventory and asset emergency response plan.

3.0 PWS ASBESTOS MANAGEMENT PROGRAM

3.0 PWS Asbestos Management Program

An "Asbestos Management Plan" was developed by PWS (May 2000) and an inventory of ACM was completed for most assets. This inventory is summarized in the document ***"Asbestos Management for GNWT Assets Inspection Report (2001-2002)"***. In some buildings, warning labels were placed on the ACM in service areas where there is friable ACM. Workers accessing these areas must be informed of exact locations of ACM's, and trained on how to deal with potential asbestos fibre release due to accessing or renovations to these areas. They must also be made aware of who to contact for additional information, and trained in how to adequately protect themselves when in the ACM area. Public areas are not labeled unless there is significant potential for damage to ACM's and thus for the release of friable asbestos.

The Computerized Maintenance Management Program includes a notation if the asset contains hazardous materials such as ACM. A warning appears on every Work Order generated for assets with hazardous materials.

The Tangible Capital Asset System (TCA), which is used to inventory GNWT assets, has a provision for documenting hazardous material in buildings. However, not all departments have fully entered the data for their buildings.

THIS MEANS THAT THE ABSENCE OF THIS NOTATION SHOULD NOT BE TAKEN AS AN INDICATION THAT HAZARDOUS MATERIAL IS NOT PRESENT.

4.0 Project Planning

4.0
PROJECT
PLANNING

As with any work process, there are some general rules for asbestos removal work. The following rules shall apply to all ACM removal:

- When work is to be performed in an occupied building, give written notification to all occupants. Provide an opportunity to raise and answer questions and concerns before starting work.
- Confirm that all contractors with any involvement with the building have signed a copy of the "*Contractor Notification and Acknowledgement of Hazardous Material*" document.
- Determine if the local landfill is registered with ENR to receive asbestos.
- Confirm that the operating authority for the local landfill is willing to receive waste asbestos.
- Isolate the area where removal work is to be conducted from all other areas by means of constructed seals, and in some cases, negative air pressure. A written detailed work plan must be generated because the procedure used must be reviewed and accepted by the WSCC prior to implementation. A minimum of 72 hours notice prior to starting work is required.
- If removal work involves an entire floor, the elevator and doors should be locked to prevent unauthorized entry.
- Absolutely no SMOKING, EATING, DRINKING or CHEWING is allowed in an asbestos work area. Signs to indicate this must be posted.
- Provide copies of all information to the Regional Asbestos Coordinator to update the Asbestos Inventory as necessary and convey the information including the results of air monitoring (if undertaken) to the Departmental Asbestos Management Coordinator.

5.0 INSTRUCTION AND TRAINING

5.0 Instruction and Training

The department shall ensure that any person working on any removal procedure has been certified in asbestos abatement through a recognized training course. The Project Officer or Regional Asbestos Coordinator will record the Name, Certificate ID number and Certificate expiry date of every worker on the premises.

The training must include:

- the hazards of asbestos exposure, particularly to smokers;
- personal hygiene and work practices;
- minimizing fibre release;
- the use, fitting, cleaning and disposal of respirators and protective clothing;
- response to emergency situations;
- following prescribed procedures for all ACM tasks;
- applicable regulations;
- exposure limits;
- monitoring;
- enclosure construction, and glove bag alternatives;
- labeling and waste disposal; and
- decontamination procedures.

The instruction and training related to respirators addresses:

- the limitations of the equipment;
- the inspection and maintenance of the equipment, particularly respecting valve functions, strapping, connections to airflow sources, and effectiveness of filters;
- the fitting of the equipment, including fit testing by qualified personnel, and regular fit checks performed by the protected user;
- the disinfecting of the equipment;
- filter change schedules.

6.0 WSCC Notification

WSCC must be notified seventy two (72) hours before starting any project involving the encapsulation, enclosure, and removal of ACM. Depending on the work, the Project Officer, (in the case of a project), or regional asset management, (in any other case) is responsible to do this or confirm it is done.

In the event of an emergency event involving ACM, work to contain or stop the release of asbestos fibres can be initiated without delay using acceptable procedures. However, all reasonable effort should be taken to contact a WSCC officer at the earliest opportunity.

The following information shall be supplied to the WSCC, in writing:

- The name, address and telephone number of the person giving the notice.
- The name, address and a contact telephone number for the place where the work will be carried out.
- The municipal address or other description of the place where the work will be carried out.
- A description of the work (detailed safe work procedures) that will be carried out.
- The starting date and expected end date of the work.
- The name and telephone number of the supervisor in charge of the work.
- The training the individual workers and supervisor have completed.
- The total number of employees involved in the removal of asbestos.

Do not commence work until the WSCC has indicated acceptability of the submitted work plan.

It is important that PWS staff remember that the owner of the building has the ultimate responsibility for the asbestos and how it is handled. Regardless of terms and conditions written into a contract, the building owner and their agent will be accountable for any improper actions.

6.0 WSCC NOTIFICATION

7.0 SPECIFIC REQUIREMENTS

7.1 Isolation of Work Area

Before beginning the removal of ACM in an occupied workplace or a work-area where other processes are taking place, follow these rules:

- Post signs indicating **"ASBESTOS REMOVAL – NO ADMITTANCE"**.
- Restrict access to the removal area to those people directly involved in the asbestos removal and site supervisors.

Where removal of ACM is performed in an occupied workplace or work-area that is not physically separate from other areas, construct a temporary enclosure to prevent asbestos fibres from leaving the removal area. This enclosure shall:

- Use 0.15 millimeters (6 mil) polyethylene sheeting for walls and floors.
- In heavy traffic or wear areas, install extra layers or utilize reinforced poly.
- Where needed, setup temporary framing to support plastic sheeting.

Where a glove bag or similar device (manufactured specifically for the purpose of removing asbestos within a small confined air space) can be used in place of a constructed enclosure, this may be acceptable to the WSCC.

Remove all moveable items from the work area.

For items that cannot be moved, cover them in polyethylene sheeting. Taped or seal to make it airtight.

Evaluate any change of emergency egress and take necessary steps to ensure requirements for fire fighting, emergency exits and emergency lighting requirements are met. It should be considered, at this point, to arrange a site tour for local fire fighting personnel so that they understand and agree with emergency access/egress procedures.

Ventilation:

- For the duration of the work, it may be necessary to maintain the area within a constructed enclosure under negative pressure twenty-four hours per day with a minimum of 4 air changes per hour or a static pressure of negative five (-5) pascals (-0.02 inches of water) relative to the static pressure of other areas and outside the enclosure.
- Exhaust from the work area should be to the outside when possible and through a dual filter system ending with a HEPA filter.
- Disconnect all building mechanical ventilation supply and exhaust from the work area or enclosure. Seal the vents with polyethylene sheeting.
- Take care that air cannot escape at points around ducts, piping, conduits or other holes inside the enclosure.

7.2 AIR MONITORING

7.2 Air Monitoring

The need for air monitoring is risk-based. Air monitoring is required during abatement and at the completion of abatement (after surfaces are dry) for moderate-risk abatement. For both moderate and high-risk abatement situations air monitoring is required before, during and after the asbestos removal project. Areas both inside and outside work-site enclosure must be sampled. The results of all monitoring events must be disclosed to the abatement workers.

7.2.1 Background Air Testing

Before the removal work starts, the department or agent will carry out background air testing in order to establish background levels of contamination.

7.2.1.1 Ongoing Air Testing During Abatement

During work, if air monitoring shows an increase in airborne fiber concentrations outside the enclosure containment system, stop work until the source of the contamination is found and fixed. Similarly, any fibre levels measured inside an enclosure at levels > ½ PF of the PPE being used will trigger corrective action by the abatement personnel.

In high-risk abatement situations, inside and outside enclosure air testing will be conducted on a daily basis, with results available within a 24-hour period. This will also include air samples collected from the clean room and work area.

The contractor shall clean any areas that have been contaminated as a result of the contractor's work. **The contractor should be required to carry a mandatory insurance provision covering this event.**

7.2.1.2 Final Air Testing

Do final air testing when:

- removal is complete, and prior to dismantling of any enclosure barriers;
- the polyethylene sheeting not necessary to the integrity of containment has been removed;
- All work has stopped (including clean-up), the work area is clean and dry (usually requires a settling time of 4 to 12 hours), and access to the work area is restricted to monitoring staff.

Air testing will consist of filtered air samples of sufficient volume to yield a maximum limit of 0.01 fibres/cc.

Contractors should expect at least a 48 hour delay from the time the samples reach the laboratory to the time the results are known.

For final air testing take at least two samples inside the work area and two samples outside the work area. At least one air sample should be collected for every 110 square metres of surface area under containment.

7.2.2 Final Air Testing: Exterior Areas

Final air testing is not required for exterior, open work areas. Instead, the department will perform a thorough and meticulous inspection to determine contractor compliance.

7.2.3 Final Air Testing: Glove Bag Procedure

Before final air testing the department will visually inspect each work area in which glove bag removal has occurred.

Test and analyze each work area using static sampling procedures.

A final air test of the general areas of glove bag removal may be performed at the department's discretion.

7.2.3.1 Failure of Final Air Tests

When the results of the final air test show values of airborne asbestos in excess of the final air standard, the Contractor (at their own expense) must re-clean and re-glue the work area. Containment barriers are not removed until air quality clearance is obtained.

The final air testing procedure shall then be repeated at Contractor's expense. After final inspections and final air testing are complete and the results known, the department will report the test results to WSCC and the Contractor.

7.2.1.2
FINAL AIR TESTING

7.3 PERSONAL PROTECTIVE EQUIPMENT

7.3 Personal Protective Equipment

Personal protective equipment (PPE) must be provided to all workers.

For glove bag removal or minor work such as debris clean up or encapsulation of ACM:

- Full body covering (with tight seals at wrists and ankles) consisting of approved disposable coveralls and covers for heads and footwear.
- Approved respirator with required HEPA filters (100 series with minimum PF of 10). Use of this equipment absolutely does require removal of any facial hair that interferes with the seal, and is subject to a fit test procedure.
- Foot, hand and eye protection and (where necessary) hard hats.

For wet removal of ACM:

- Full body covering, including the head, consisting of approved disposable coveralls as well as footwear.
- Approved respirator with HEPA filters (minimum PF of 50), or supplied air breathing apparatus. Use of this equipment will also require removal of any facial hair that interferes with the seal, and is subject to a fit test procedure.
- Waterproof foot and hand protection.
- Eye protection and (where necessary) hard hats.

7.4 Personal Hygiene

7.4
PERSONAL HYGIENE

Care must be taken to ensure material from the work area enclosure does not migrate from the enclosure. The following rules are to be enforced to prevent this migration:

- Facilities for washing hands and face will be made available and will be used by every employee when leaving the work area.
- In some cases, a full body shower and change of clothing may be required before leaving the enclosure. In such cases, the enclosure must consist of three separate rooms: the work area, a dirty room, and a clean room connected by wash facilities to the dirty room.
- Where wet ACM is to be removed, street clothes must be left in the clean room of the enclosure.
- All applicable protective clothing and equipment shall be worn in the work area, footwear is to remain in the work area until work is completed and footwear has been cleaned.
- Other than the respirator, all contaminated clothing must be removed and bagged before any worker leaves the work area.
- Workers may remove the respirator once the hair and body have been thoroughly wetted in a proper shower.
- The shower must be supplied with hot and cold running water or tempered water between 40°C and 50°C.
- Soap, shampoo and clean towels shall be provided as needed.
- After showering, workers may proceed to the clean room to dress in street clothes.

When a glove bag method is used as the enclosure, workers shall remove and bag protective clothing before leaving the work area. Once the protective clothing has been bagged the respirator may be removed.

Toilet facilities should be provided in or near the clean room on the decontaminated side of the enclosure, or outside the enclosure. Decontamination procedures are necessary for personnel to access toilet facilities.

No smoking, drinking, eating or chewing is allowed inside the enclosure, or in the immediate vicinity outside the enclosure.

7.5 WASTE DISPOSAL

7.5 Waste Disposal

After ACMs have been removed, proper care must be exercised to ensure no contamination occurs in surrounding areas.

- Place ACM in polyethylene bags or other approved airtight containers of at least 0.15 mm (6mil) thickness. ACM that could puncture an airtight bag must be double-bagged and then placed in an approved puncture-proof container. Printed asbestos warning labels must appear on the outer surface of the container.
- The container must be wiped or vacuumed with a HEPA vacuum.
- Never break material into smaller pieces to fit into containers unless this is performed under negative air conditions, with the capability of applying a mist when necessary to reduce fibre levels.
- All efforts should be taken to eliminate or minimize storage requirements. However, if necessary, store all waste material in a designated area with posted signage and/or caution tape, secure against accidental damage until transported to a disposal site in an appropriately licensed and enclosed vehicle.
- Drop sheets and barriers that are to be discarded are to be wetted or HEPA vacuumed and folded in on themselves. Treat them as asbestos contaminated material.
- Waste materials, including discarded polyethylene sheeting, sealing tape, cleaning materials, protective clothing, vacuum bags, and other contaminated materials, are treated as any other ACM for disposal purposes.

7.6 Cleanup

7.6
CLEANUP

After the removal of the ACM, all surfaces in the work area are to be dusted with a damp cloth or vacuumed with a HEPA vacuum. After use, any cloths, mops, etc., are considered to be asbestos waste, and disposed of.

Compressed air is not to be used to clean up or remove asbestos dust from any surface.

Leave the work area/enclosure intact and under negative pressure until all spray seal (glue) has dried (usually 4 to 12 hours) following completion of the cleanup.

Workers involved in the cleanup follow the same personal protective and hygiene practices as workers involved in removal work. (See 7.3 and 7.4)

Before the enclosure is dismantled, perform air sampling to ensure the level of asbestos fibres does not exceed the limit defined by pre-removal air testing or by WSCC limits, whichever is lowest.

Signs are not to be removed until air samples are tested and prove to be within the acceptable limit.

8.0 CLASS 1 (LOW RISK) ASBESTOS REMOVAL TASKS AND PROCEDURES

8.1 Class 1 - Description

Installation or removal of individually manufactured products containing asbestos, including products such as vinyl floor tiles, acoustic drop-ceiling tiles, gaskets, seals, packing, friction products, or asbestos cement products such as cement wallboard where no joint compound was used.

Cutting, drilling or shaping of a product mentioned in the previous paragraph by the use of hand operated tools, where water is used to control fibre release.

Application of tape, mud, a sealant, or other covering to pipe or boiler insulation containing asbestos.

Encapsulation of asbestos-containing material in a manner that does not disturb the asbestos.

Clean up of general debris, when wetted or by HEPA vacuum that may contain ACM that have detached from installed locations.

8.2 Class 1 - Procedures

Install barrier tape and warning signs in proximity to the work area.

Approved respirators (HEPA filters and fit testing required) and protective clothing suitable for asbestos (or better) are to be made available for the use of employees.

Do not conduct any dry removal. However, individual manufactured pieces as well as loose debris can be wetted and picked up by hand and placed into 0.15mm (6 mil) polyethylene bags (double bagging is required) with printed asbestos warning labels. Do not purposefully break pieces into smaller sizes to make it easier to bag or transport. Larger pieces may require larger bags or plastic wrapping instead of bagging. In this event, asbestos labels will have to be manually attached to the wrapping, identifying it as asbestos waste. For debris containing "sharps", seal it in puncture-proof containers (usually wooden boxes or barrels) in addition to the polyethylene bags.

Control the spread of asbestos dust from the immediate work area by measures appropriate to the work to be done. This includes the use of drop sheets of polyethylene or other suitable material, use of wet wipes to collect dust, and the use of HEPA vacuums to collect dust.

In the case of an operation mentioned in paragraphs 8.1 (2), (3) and (4), wet the product, unless wetting creates a hazard or causes damage. Repeat the wetting frequently (regular intervals) during the work and immediately upon completion of the work.

Clean up dust and waste containing asbestos and remove it using a vacuum equipped with a HEPA filter, or by damp wiping or mopping.

Drop sheets must be disposed of as asbestos waste. They should be wetted down or HEPA vacuumed, rolled in on themselves and double bagged for handling and disposal.

9.0 CLASS 2 (MODERATE RISK) ASBESTOS REMOVAL TASKS AND PROCEDURES

9.1 Class 2 - Description

The removal of a drop-ceiling, or part of it, to access a work area, where **any** quantity of friable material containing asbestos is likely to be lying on the surface of the drop-ceiling. *This is typically only where sprayed on material was applied above the ceiling.*

The minor removal or minor disturbance (less than 0.09 m^2 or 1 ft^2 of surface area) of friable material containing asbestos during the repair, alteration, maintenance or demolition of all or part of a building, or any machinery or equipment, or where the minor removal or disturbance is more than a *Class 1 Task.*

The removal of pipe insulation containing friable asbestos with the help of a commercial containment bag (glove bag) in amounts greater than absolutely necessary to do emergency repairs.

Use of power tools having a dust collection device equipped with a HEPA filter to cut, grind, or abrade an ACM product.

Removal of drywall where asbestos joint-filling compounds have been used.

Clean-up of small quantities of friable asbestos debris that has detached from where it was applied. Typically this will be ACM mud from pipe fittings.

Any operation not mentioned in paragraphs (1) to (6) above that may cause exposure of an employee to asbestos, and that is more than a *Class 1 and less than a Class 3 Task.*

9.2 Class 2 - Procedures

Establish barriers and erect signage around the working area.

Shut down all air-handling systems that enter/leave the working area and close passage doors to minimize air-flow throughout the working area.

Use water or amended water to control the spread of asbestos dust, unless wetting creates an electrical or slipping hazard or causes damage.

- Control all visible dust using drop sheets and HEPA vacuums.
- Spray ACM thoroughly with water or amended water before beginning removal work.

Only persons wearing protective clothing and proper respiratory protection may enter a work area that has been designated as Class 2 Removal:

- Every employee who enters the work area is to be provided with appropriate respiratory protective equipment that has been fit tested prior to use.
- Respirators are to be NIOSH approved, reusable, air purifying dust respirators (or better), for protection against asbestos. Filters should be at least N/P/R 100 filters.
- When not in use, reusable respirators are to be maintained and stored in a clean and sanitary location that is easily accessible.
- Where practicable assign the respirator to a worker for their exclusive use.
- Clean, disinfect and inspect respirators after each use and after every shift during which they are used in an ongoing process.

Provide protective clothing to every employee who enters the work area:

- The protective clothing consists of disposable coveralls that are full body covering and covers for heads and footwear.
- Any protective clothing must be repaired (with duct tape) or replaced if torn.
- Decontaminate by wet wiping or by using a vacuum equipped with a HEPA filter before leaving the contaminated work area; and
- Discard as asbestos-contaminated material after use.

Before starting work that is likely to disturb friable material containing asbestos that is crumbled, pulverized or powdered, and that is lying on any surface, first wet down and then clean up and remove the friable material by damp-wiping, or by using a vacuum equipped with a HEPA filter.

In the case of an operation mentioned in paragraphs 9.1 (2), (3) and (4), wet the product, unless wetting creates a hazard or causes damage. Repeat wetting frequently (regular intervals) during the work and immediately after you finish.

Clean up waste containing asbestos and place into a suitably lined container or a 0.15 millimeter (six mil) polyethylene bag. Remove dust by damp-mopping or using a vacuum equipped with a HEPA filter. Seal waste containing “sharps” in puncture-proof containers in addition to the poly bag or liner.

Drop sheets are to be discarded after use. They are first to be vacuumed or sprayed down with water, folded inward and then treated as ACM waste by double bagging.

10.0 CLASS 3 (HIGH RISK) ASBESTOS REMOVAL TASKS AND PROCEDURES

10.1 Class 3 - Description

The removal, other than the minor removal (as described above in Classes 1 and 2), of material containing asbestos during the repair, alteration, maintenance or demolition of all or part of a building, or any machinery or equipment.

The spray application of an encapsulant over friable asbestos using a low-pressure sprayer.

The use of a power tool not having a dust collection device equipped with a HEPA filter to cut, grind or abrade an ACM product.

The cleaning or removal of air-handling equipment, including rigid ducting, in a building that has sprayed-fireproofing containing asbestos.

Any indoor or outdoor operation involving the dry removal or stripping of friable asbestos-containing materials.

The repair, alteration or demolition of a boiler, kiln, metallurgical furnace or similar device or part thereof, made in part of refractory materials containing asbestos.

10.2 Class 3 - Procedures

10.2.1 Preparation

Post signs around the removal area to restrict access. Post enough signs to warn of the hazard. State in large, clear letters that:

- ASBESTOS WORK AREA, LUNG CANCER HAZARD.
- ACCESS TO THE WORK AREA IS RESTRICTED TO AUTHORIZED PERSONS WEARING PROTECTIVE CLOTHING AND RESPIRATORY PROTECTIVE EQUIPMENT.
- NO EATING/DRINKING/SMOKING/CHEWING.

All employees must wear respiratory protection on-site during the preparation of work areas for asbestos removal, where any disturbance of the material may occur.

- The respiratory protection must have a minimum protection factor of 50, and be approved by NIOSH for protection against asbestos.
- The protective device must be fitted so that there is an effective seal between the respirator and the employee's face.
- Where practicable, assign a respirator to an employee for the employee's exclusive use.
- When using respirators, follow the procedures of the equipment manufacturer.

Reusable respirators must be cleaned, disinfected and inspected:

- after use;
- at least once each shift, when issued for the exclusive use of one employee;
- after each use when used by more than one employee.

When not in use, maintain and store reusable respirators in a clean and sanitary location.

Disable the mechanical ventilation system serving the work area to prevent contamination and fibre dispersal to other areas.

- Switch off the system where possible.
- Seal the ventilation ducts to and from the work area.
- Where the ventilation system cannot be switched off, blank off the main ventilation duct to the area with rigid impervious material such as metal or wood.

Take all moveable equipment and material from the work area.

Seal with polyethylene sheeting, floors, walls and any items remaining in the room.

- Repair immediately any damage to the polyethylene sheeting that occurs as the work proceeds.
- The polyethylene sheeting should have a minimum thickness of 0.15 mm (6 mil).

Use drop-sheets during outdoor removal operations. Take every precaution to avoid electric shock. Disconnect electric power to permanent fixtures, except that temporary connections may be made to light the work area and for the operation of asbestos-removal equipment.

In wet removal operations the only electrical equipment that can be used is:

- battery operated;
- double insulated;
- bonded to ground, extra low voltage, not exceeding 30 volts and 100 volt-amps;
- bonded to ground, and equipped with a ground fault circuit interrupter of the Class A type, that is tested before each use.

Setup a decontamination area adjacent to the work area. This structure should be fully air tested before use to ensure that there is a negative air flow, bringing outside air through the sequential decontamination chambers and into the work area. The decontamination structure consists of:

- Entry from outside into a clean room suitable for changing into clean protective clothing (entry) or street clothes (exiting), and for storing clean clothing and equipment;
- Entry to a shower room from the clean room as described below.
- Entry from the shower room into a "dirty" changing room suitable for putting on reusable protective clothing such as boots and work gloves.

Provide and use "Air lock doors" between the different rooms in the decontamination structure as follows:

- They consist of layers of polyethylene with at least a three-foot overlap.
- These sheets are weighted at the bottom to keep the flaps closed.
- They are arranged in sequence.
- They are constructed so as to prevent the spread of asbestos dust.

The shower room in the decontamination facility

Is to be located between the contaminated change room and the clean change room.

Has an individual control inside the room to regulate water flow, and if there is hot and cold water, individual controls inside the room to regulate the temperature.

Must provide adequate supplies of hot water to maintain a water temperature of at least 40°C but no more than 50°C.

Is to be provided with clean towels. Towels, once used, should be left in the shower room placed into a plastic container with a lid.

No contaminated clothing will be permitted to be removed from the dirty room unless it is sealed in asbestos bags and treated as asbestos waste. Respirators shall be donned in the clean room (upon entry) and shall not be removed until showering in the shower room (upon exiting).

Make sure adequate toilet facilities exist in the clean room (or outside the enclosure), and that employees go through the proper decontamination sequence before going to the toilet facilities.

10.2.2 Class 1 - Asbestos Removal

Establish negative air pressure inside the work area before removing any asbestos-containing material. Negative pressure should be tested daily (-5Pa 0.02").

Install HEPA filters on the exhaust unit(s) used to create negative pressure.

Operate the negative air units on a 24-hour basis.

Maintain a minimum of four air changes per hour in the removal area.

Where possible, exhaust the air from the work area to the outdoors or to an area with impervious material such as wood or metal.

Maintain the integrity of the enclosure and the adequacy of the negative air pressure by:

- conducting smoke tests;
- a daily visual inspection of the enclosure;
- Any deficiencies must be repaired prior to starting the daily work shift.

Personal Protective Clothing:

- is provided by the employer, and worn by every employee who enters the work site;
- consists of full body covering, including head covering, with snug fitting cuffs at the wrists, ankles and neck, (disposable coveralls are strongly recommended);
- is replaced or repaired if torn;
- includes suitable footwear, that must not be taken from the work site unless covered adequately while on the work site;
- is donned in the clean changing room, and street clothes are left in the clean changing room, preferably in individual lockers;
- is removed when leaving the work site and is stored, or discarded in the first ("dirty") change room.

10.2.2
ASBESTOS REMOVAL (NOTE: HIGH RISK REMOVAL IS TO BE CONDUCTED BY THIRD PARTY CONTRACTORS, NOT BY PUBLIC WORKS AND GOVERNMENT SERVICES PERSONAL)

Personal Respiratory Protection:

- consists of Powered Air Purifying Respirators (PAPR) fitted with NIOSH approved cartridges for asbestos, or HEPA filters (N/P/R 100);
- consists of a NIOSH approved airline respirator for any dry removal;
- is worn by all employees involved in, or monitoring, the asbestos stripping or clean-up;
- is worn in the manner described in the manufacturer's instructions;
- is properly fitted on employees;
- filters are changed at least as frequently as the manufacturer recommends.

Special precautions are taken for employees inside the removal area:

- Eating, drinking, chewing or smoking inside the change room, shower room, hall ways, storage room(s) or removal area are strictly prohibited.
- Complete decontamination is required prior to eating, drinking, chewing or smoking.
- Respiratory protective equipment is not removed inside the asbestos work area.
- Employees take coffee breaks and have lunch in an area completely separate from the asbestos removal area.

When an area is being stripped:

- Only authorized personnel are permitted to enter the area.
- Employ wet methods in all cases except where electrical conductors or electrical equipment cannot be de-energized. Written permission must be obtained from a WSCC Safety Officer before proceeding with dry stripping.
- Amended water is used for soaking asbestos-containing materials.
- Spray amended water with airless spray equipment, set at the lowest operable pressure.
- Thoroughly spray asbestos-containing material with amended water. Ensure that the material has been saturated, (fallen material should be wet enough that water can easily be squeezed from it by hand).
- Do removal in small sections, i.e., about 30 square feet. After stripping, place all fallen material in a 0.15 mm (six mil) or thicker polyethylene bag.

After removal has begun, all persons leaving the work area must perform personal decontamination:

- Damp wipe or HEPA vacuum PPE while in work area.
- Remove work clothes and discard into asbestos bags in the "dirty" room (the room between the work area and the shower room).
- Remove respiratory protection after thoroughly showering including the wiping of the respirator in the shower. Employees only proceed to the clean change room after a thorough showering.
- Where the protective clothing (including hard hats, if used, and work boots) will be reused, it is decontaminated using a vacuum equipped with a HEPA filter or by damp wiping before removing. These items are to be left in the "dirty" room.
- Where the protective clothing will not be reused, it is discarded in the same way as asbestos-contaminated material.

NOTE: In the case of serious injury to a person in the work area, and in this case only, decontamination procedures may be waived in the interests of obtaining medical aid.

10.2.3 CLEANUP OF REMOVAL AREA

10.2.3 Cleanup of Removal Area

Following removal of asbestos, the entire area, including the decontamination area, is wet cleaned and vacuumed with HEPA filters to remove all visible residue.

The equipment used during the removal is:

- wet wiped,
- washed and wrapped in polyethylene, or
- placed in plastic bags, and
- brooms are sealed in plastic bags and cleaned later or discarded as Asbestos waste.

A sealant is then applied to the entire area and to the remaining plastic:

- The sealant is sprayed-on using an airless spray, that is used in accordance with the manufacturer's recommendations.
- A negative pressure is maintained inside the enclosure during this process.

Employees involved in clean-up use personal protective equipment and respiratory protection such as described in paragraph 10.2.2 (Personal Protective Clothing and Personal Respiratory Protection).

Employees involved in the cleanup follow the same personal decontamination procedure as described in paragraph 10.2.2 (Perform Personal Decontamination).

The showers are dismantled and removed last, in order that employees engaged in the clean-up procedures can use them.

10.2.4 Clearance Sampling

10.2.4
CLEARANCE
SAMPLING

Clearance sampling is compulsory for all Class 3 projects where the project site is to be re-occupied (except for outdoor operations).

A guideline value for clearance sampling is 0.01 fibre/cm^3. It may be necessary, at the discretion of air monitoring personnel, to conduct aggressive sampling. This requires the use of a portable blower fan to disturb the air in the work area in conjunction with air sample collection.

10.2.5 Encapsulation

The preparation of a work area is conducted the same way as the removal of asbestos-containing material (Class 3) i.e., subsection 10.2.1.

Personal protective clothing is used as described in paragraph 10.2.2 (7).

Personal respiratory protective equipment is used as described in paragraph 10.2.2 (8).

The special precautions outlined in paragraph 10.2.2 (9) are taken during these procedures.

The personal decontamination procedures used are as described in paragraph 10.2.2 (11).

Encapsulant (either the bridging or the penetrating type) is applied over the surface of the asbestos-containing material using airless spray equipment at low pressure setting.

The clean-up procedures are as described in subsection 10.2.3.

Do not apply a liquid sealant or encapsulant to friable material that contains asbestos, if the friable material has deteriorated, or if there is insufficient strength and adhesion to support the weight of the sealant and the friable materials.

11.0 REMOVAL OF RESILIENT FLOOR COVERINGS

11.0 Removal of Resilient Floor Coverings

This removal is considered to be low-risk Class 1, and will follow low risk procedures. Vinyl-asbestos tile and asphalt tile contain asbestos fibers, as did some asphaltic "cutback" adhesives and the backings of many sheet vinyl floorings and lining felts. The presence of the asbestos in these products is not readily identifiable. The US Environmental Protection Agency (EPA) and some other regulatory agencies recognize that those products are non-friable *(i.e. when dry cannot be crumbled, pulverized or reduced to powder by hand pressure)* unless certain activities occur.

While resilient floor covering products manufactured today do not contain asbestos, the asbestos used in the older products was encapsulated in the matrix of the product.

Unless positively certain that the product you intend to remove is a non-asbestos-containing material, you must assume it contains asbestos. Testing should be conducted if costs for testing are considerably less than removal costs.

Numerous products, devices and techniques have been recently introduced or recommended for the removal of resilient floor covering structures. Before you allow the use of any practices for the removal of an in-place resilient floor-covering product that contains (or is assumed to contain) asbestos, you must determine that the practice meets all applicable regulations including the WSCC standards for occupational exposure to asbestos.

You must also determine that any materials used during the removal practice will be compatible with the new floor covering to be installed.

For the purposes of this guideline PWS is assuming that certified abatement personnel are not required for flooring removal providing the guidelines are followed and a trained, experienced supervisor or PWS employee is directly managing the work. The workers should be made knowledgeable by the supervisor.

11.1 General Rules for Removal of Resilient Floor Covering

Unless positively certain the product you intend to remove is not asbestos-containing material, you must assume it contains asbestos and remove it accordingly. A sample of the material could be collected and tested if removal costs are significantly higher than they would be with no asbestos content.

Removal of existing floor covering should be considered the last alternative.

Never sand, dry scrape, drill, saw, beadblast, or mechanically chip or pulverize any resilient flooring, backing, lining, felt, asphaltic "cutback" adhesive, or other adhesive to remove them from the floor. Be aware that some mastic glues may contain asbestos, and will have to be scraped off using non-powered hand tools.

Always use a vacuum equipped with HEPA filter, disposable dust bag, and metal floor attachment (no brush).

Do not dry sweep.

All sheet floor removals must be performed using detergent solution.

All felt scraping must be done wet.

Prior to removal, all tile must be wetted (except in cases where heat will be applied).

Warning! Electrical shock hazard exists. Use a ground fault interrupter for any electrical connections of equipment used in a wet environment.

Be careful. Resilient flooring becomes slippery when wet with the specified detergent solution. Use caution to contain the solution in the immediate work area. Standing on a new sheet of plywood or non-slip surface while working is recommended.

Material removed must be placed in heavy-duty impermeable bags at least 0.15 millimeter (6 mil) thick or in a leak-tight container, properly labeled and disposed of in an authorized landfill. Seal material containing "sharps" into puncture-proof containers in addition to the poly seal layer.

11.1
GENERAL RULES FOR REMOVAL OF RESILIENT FLOOR COVERING

11.2 REMOVAL OF FULLY-ADHERED RESILIENT SHEET FLOORING

11.2 Removal of Fully-Adhered Resilient Sheet Flooring

Remove all furniture and appliances from the work area.

Remove any binding strips or other restrictive moldings from doorways, walls, etc.

Prepare the specified liquid dishwashing detergent solution (454 cc/16 oz. of specified liquid dishwashing detergent to 4.54 litre/one gallon of water) and pour into a hand sprayer.

Before removal begins, vacuum the entire floor using a HEPA vacuum with a metal floor attachment.

Make a series of parallel slices 100 mm to 200 mm (4" to 8") apart through the top layer of the flooring and about halfway through the backing, parallel to the wall, for the entire floor.

Wear layer removal: One worker starts at the end of the room farthest from the entrance door and pries up the corner of the strip, separating the backing from the wear layer. As the strip is being removed, another worker sprays a constant mist of the specified liquid dishwashing detergent solution into the delamination nip point to minimize any airborne dust particles. When done properly, the felt remaining on the floor and on the back of the strip will be thoroughly wet.

- Do only one, 1 metre wide-strip area at a time.
- Stand on the remaining floor covering or clean floor (to the extent feasible, minimize standing on the felt).
- The sliced strips should be peeled from the backing by pulling or rolling around a core that will control the stripping angle to create a uniform tension (some resilient flooring wear layers may not be readily strippable and may require wet-scraping).
- Tie or tape the removed material securely and place in the heavy-duty impermeable trash bag or closed leak-tight container for disposal.

Remove and dispose of each succeeding strip in the same way.

- Minimize walking on the exposed felt.
- Worker footwear must be cleaned or removed before leaving work area.
- Close full bags tightly, and seal securely for disposal.
- Identify with an appropriate label stating: **Dispose in an approved landfill only.**

Occasionally, parts of the top or inner layer will stick to the backing. This can often be eliminated by peeling in the opposite direction. The stiff-bladed scraper may help in the removal or peeling of these layers.

Wet-scraping residual felt:

- After three strips of flooring material are removed, any residual felt must be wet scraped. Thoroughly wet the residual felt with the specified liquid dishwashing detergent solution. Wait a few minutes to allow the liquid to soak into the felt.
- Stand on the remaining floor covering to the extent feasible (not the felt) and use the stiff bladed scraper to scrape up the wet felt.
- Rewet the felt if the solution has not completely penetrated, if drying occurs, or if dry felt is exposed during scraping. Pick up the scrapings while still wet as they are removed from the floor and place in a heavy duty impermeable trash bag or leak-tight container. Wet-scrape all felt from this floor area before proceeding further.
- When this floor area has been cleaned free of felt, vacuum with a HEPA vacuum cleaner with the metal floor attachment. Position the vacuum cleaner so that the discharge air does not blow on the area being cleaned.
- Repeat the above on the next series of strips.
- Repeat this operation until the felt has been removed from the whole floor. Close full bags tightly and seal securely for disposal. Identify with an appropriate label stating: **Dispose in an approved landfill only**.
- When the entire floor has been removed, let it dry and vacuum with a HEPA vacuum cleaner with the metal floor attachment. Position the vacuum cleaner so that the discharge air does not blow on the area being cleaned.
- After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a heavy-duty impermeable bag at least 0.15 millimeter (6 mil) thick or leak-tight container. Close and seal the bag securely for disposal. Identify with an appropriate label stating: **Dispose in an approved landfill only**.
- A floor that has been wet-scraped must be allowed to dry before installing any new resilient flooring.

CAUTION: Excessive moisture can cause permanent damage to wood underlays. It is the contractor/worker's responsibility to use the correct amount of solution to prevent underlay damage.

11.3 REMOVAL OF LOOSE-LAY OR PERIPHERALLY-ADHERED RESILIENT SHEET FLOORING

11.3 Removal of Loose-Lay or Peripherally Adhered Resilient Sheet Flooring

Warning: Do not sand, dry sweep, dry scrape, drill, saw, beadblast, or mechanically chip or pulverize existing resilient flooring, backing, lining felt, asphaltic "cutback" adhesive, or other adhesive.

- Remove all furniture and appliances from the work area.
- Remove any binding strips or other restrictive moldings from doorways, walls, etc.
- Prepare the specified liquid dishwashing detergent solution (1/2 litre of the specified liquid dishwashing detergent to five litres of water) and pour into a hand sprayer.
- Before removal begins, vacuum the entire floor using a HEPA vacuum with a metal floor attachment.
- If flooring is loose, start at the end of the room farthest from the entrance doorway and slice a strip ½ metre wide in the loose flooring. One worker removes the sliced strip while another worker sprays the specified liquid dishwashing detergent solution directly into the separation nip point. Minimize standing on the exposed subfloor during the removal process to the extent possible.
- Roll the wet strip tightly and tie or tape securely so it will not unroll. Place it in a heavy-duty impermeable bag at least 0.15 millimeter (6 mil) thick or in a leak-tight container with an appropriate label stating, for example "Caution – Contains Asbestos. Avoid Opening or Breaking Container. Breathing Asbestos is Hazardous to Your Health." Close and seal the trash bags or leak-tight container securely for disposal. Dispose in an approved landfill.
- Clean the exposed floor with a HEPA vacuum cleaner with the metal floor attachment. Position the vacuum cleaner so that the discharge air does not blow on the area being cleaned.
- Repeat the above, slicing, rolling and disposing of one strip at a time and cleaning the newly exposed area immediately until the entire floor covering has been removed. Let the floor dry, then vacuum with a HEPA vacuum cleaner using a metal floor attachment.
- After vacuuming the used HEPA filters and cleaner bags should be removed according to manufacturer's instructions and placed in a heavy-duty impermeable bag at least 0.15 millimeter (6 mil) thick or in a leak-tight container with an appropriate label stating, for example "Caution – Contains Asbestos. Avoid Opening or Breaking Container. Breathing Asbestos is Hazardous to Your Health." Close and seal the bags or leak-tight container securely for disposal. Dispose in an approved landfill only.

11.4 Removal of Resilient Tile

11.4 REMOVAL OF RESILIENT TILE

Remove all furniture and appliances from the work area. Remove any binding strips or other restrictive moldings from doorways, walls, etc.

Before removal begins, vacuum the entire floor using a HEPA vacuum with a metal floor attachment.

Floor tiles must be wetted (misted with hand sprayer) before actual removal begins (unless heat will be used to remove tiles).

Those areas normally exposed to heavy foot traffic patterns usually have tiles adhered the tightest. In starting the tile removal process, select those areas that receive the least traffic. Try to remove individual tiles in one piece although some breakage of tiles is unavoidable.

Start the removal by carefully wedging a scraper in the seam of two adjoining tiles and gradually forcing the edge of one of the tiles up and away from the floor. Continue to force the balance of the tile up by working the scraper beneath the tile and exerting both a forward pressure and a twisting action on the blade to promote release of the tile from the adhesive and the floor.

After the tiles are removed place them, without further breakage into smaller pieces, in a heavy-duty impermeable bag at least 0.15 millimeter (6 mil) thick or a closed leak-tight container that will be used for disposal. Removed tiles can be placed in empty tile cartons first and then placed in the heavy-duty impermeable bag. To prevent tearing of the heavy-duty impermeable bag, place only one full carton of removed tile in a bag.

With the removal of the first tile, accessibility of other tiles is improved. Force the scraper under the exposed edge of another tile, and continue to exert a prying, twisting force to the scraper as it is moved under the tile until the tile releases from the floor. Remove and dispose of each tile in the manner described in the above paragraphs.

Minimize walking on the exposed adhesive to the extent possible. Worker footwear must be cleaned or removed before leaving work area. Close full bags tightly and seal securely for disposal. Identify with an appropriate label stating, for example “Caution – Contains Asbestos. Avoid Opening or Breaking Container. Breathing Asbestos is Hazardous to Your Health.” Dispose in an approved landfill only.

Some tiles will release quite easily while others require varying degrees of force. **CAUTION:** ***Wear safety glasses when using this procedure***. Where the adhesive is spread heavily or the tile is bonded tightly, it may be easier to force the scraper under the tightly adhered areas by striking the scraper handle with a hammer, using blows of moderate force while maintaining the scraper at a 25° to 30° angle to the floor.

If you find areas where even the above methods will not remove the tiles, the removal procedure can be simplified by thoroughly heating the tiles with a hot air gun or a radiant heat source until the heat penetrates through the tile and softens the adhesive.

Alternatively, without first prying up floor tiles using a scraper, a heat source like a hot air gun or infrared heat machine can be used to apply heat to the floor tile and then the tiles may be removed by hand or by using a scraper. *(Wetting the tiles is not required for this alternative removal method)*. When using this procedure, walking on exposed adhesive may be unavoidable. Worker footwear must be cleaned or removed before leaving the work area.

When using an infrared heat machine, follow manufacturer's instructions.

After tiles are removed, place them in a heavy-duty impermeable bag at least 0.15 millimeter (6 mil) thick or other closed leak-tight container without further breakage. Removed tiles can be placed in empty tile cartons first and then placed in the heavy duty impermeable trash bags. To prevent tearing of the heavy-duty impermeable trash bag, place only one full carton of removed tile in a bag.

Close the full bags of removed tile tightly and seal securely for disposal. Identify with an appropriate label stating, for example "Caution – Contains Asbestos. Avoid Opening or Breaking Container. Breathing Asbestos is Hazardous to Your Health." Dispose in an approved landfill only.

12.0 Removal of ACM Vermiculite Insulation

This removal is considered to be Class 3, high risk.

Vermiculite has been used extensively in Canada as an insulation product. Mostly in attics, but also in walls. Vermiculite has recently been identified as a product to be tested for possible ACM. When vermiculite is disturbed, the asbestos (if present) will become airborne and is hazardous to unprotected people who come in contact with it.

There are two methods used to control the release of ACM dust in vermiculite. These are wetting agents and vacuum systems.

12.1 Wet Removal (high risk)

When the wet removal process is used, the worker requires full protection. Negative air conditions in the removal area should be applied to insure that the rest of the building is not affected by the removal procedures. If access to an attic cannot be from the outside then a decontamination area must be developed at the base of the attic access. The decontamination area would also have to be under negative air flow, that should be vented outside the building through a window, door or constructed vent hole. The decontamination room and adjoining clean and change rooms shall be constructed and used as described in the Level 3 removal procedures.

Use common wetting agents or de-ionized water to soak the vermiculite insulation. It can then be mechanically removed using shovels or trowels. Place the insulation into a heavy-duty impermeable bag at least 0.15 millimeters (6 mil) thick or other closed leak-tight container. Close full bags tightly and seal securely for disposal. Identify with an appropriate label stating, for example “Caution – Contains Asbestos. Avoid Opening or Breaking Container. Breathing Asbestos is Hazardous to Your Health.” Dispose in an approved landfill only. Once most of the asbestos/ vermiculite material has been removed use vacuums with HEPA filters to complete the removal.

Follow removal by applying abatement glue through a low pressure sprayer. Do final air testing to make sure the area is now safe.

12.0 REMOVAL OF ACM VERMICULITE INSULATION

12.2 Vacuum Removal (high risk)

It may be more appropriate to use a bulk vacuum system in areas where ceiling or building damage from wetting agents is a concern or in cold weather conditions where added wetting agents in the attic will cause frozen and slippery conditions.

Bulk vacuum systems must be equipped with a HEPA filter as well as a mechanism to capture bulk vermiculite/asbestos mixtures. Standard asbestos vacuums are not practical as they have a limited capacity and are not designed to capture large volumes of bulk material.

In open empty buildings such as warehouses, the vacuum connections, as well as the negative air system can be set right on the floor beneath the attic entry. Dust will be collected mostly by the vacuum, and the negative air system will collect residual airborne dust, as well as dust that might arise when changing vacuum bags.

When the building is not empty, extend vacuum hoses through the roof or ventilation baffles. Place the vacuum itself outside or in an outside enclosure attached to a negative air system. Similarly, a negative air unit, if used outside simultaneously, could ventilate outside from the attic through existing roof-mounted vents.

Workers inside the attic doing the removal work must decontaminate within an enclosure constructed inside the building. Requirements for this are identified earlier in this document.

Final air testing should be done to ensure the building is safe to use.

13.0 Asbestos Removal Under Cold Conditions

13.0 ASBESTOS REMOVAL UNDER COLD CONDITIONS

WSCC will not allow conducting Class 3, high-risk abatement under cold weather conditions, unless in an emergency.

Use these techniques in unheated buildings where heat cannot be supplied, when outside temperatures won't allow the use of normal encapsulants, tape adhesives, and penetrants, sealants or glues. Cold conditions refer to inside or outside temperatures below zero that cannot be easily remedied by supplemental heating. It also includes conditions where shipping of abatement products cannot be done without freezing.

Cold weather conditions may make asbestos removal difficult. The option to delay or bring forward the abatement schedule to take advantage of heated buildings or warm temperatures should be considered. If the building is not heated it might also be that it does not have lights or power as well. Portable lighting and power will have to be installed.

The hazards of asbestos particulate in the air supply are just as real under cold conditions as they are in warm conditions.

13.1 Normal Techniques That Will Not Work Under Cold Conditions

- Wet wiping for decontamination
- Use of normal liquids including penetrants, encapsulants, soaking agents and spray glues.
- Duct tape (does not stick to cold surfaces).
- Personnel decontamination showers and water supply.
- Transport and storage of abatement liquids and tape.
- Fitting of Personal Protective Equipment, particularly protective suits due to the need for a thick layer of warm clothing under the PPE.
- Protective "booties", (too small to go over insulated boots, too slippery for safe use over frozen painted or frozen linoleum/tile surfaces).
- Function of respirators (may freeze up).
- Vacuum hoses (will freeze and split or snap).

Trying to use these items may also present significant fall hazards to workers (iced walking surfaces).

13.2 What Will Work Under Freezing Conditions

- Vacuums and negative air systems. Hoses will have to be mended with appropriate tape to seal splits as they occur.
- Hand tools (staplers, hammers, 6 mil polyethylene sheeting, 6 mil asbestos waste bags, glove bags).
- Large asbestos suits that can be worn over parkas.
- Dedicated insulated boots with good anti-slip soles.
- Warm water wash facilities set up in insulated rooms such as old walk-in coolers
- Special tape designed for cold weather, supplemented with wood strips and staples for sealing hoarding.
- Portable toilets.
- Breathing apparatus with two filter cartridges and two sealed spares.

13.3 Heating

If supplemental heat can be supplied to select areas (and if these areas are required, according to hazard level Classes), the priority areas should include:

- A mask thawing station inside the abatement area (direct heat will thaw respirator cartridges instantly, while they are being worn).
- Changing rooms.
- Shower and decontamination area.
- Prime working area.
- Identified area for personnel rest.
- Toilet area.

Both the access to and egress from the showers must be heated space. Flooring will require mats to avoid ice formation and a fall hazard.

13.4 Heaters

Portable heaters are a hazard to workers. Heaters fueled by kerosene, diesel or propane should be vented outside the building to not endanger workers with exhaust fumes. In addition, most heaters use blower systems that could spread asbestos fibres. The heat vents must blow heated air into the enclosure that, in turn, is under proper negative air control. The negative air units will be filtering and exhausting heated air.

Electric heaters require a lot of power and are only effective in small areas.

Effective fire safety protocols are necessary, as a fire or explosion could injure or trap workers.

14.0 APPENDICIES

Appendicies

Appendix 1
PRODUCTS THAT MAY CONTAIN ASBESTOS

Asbestos - Containing Materials

Note: The following list does not include every product/material that may contain asbestos. It is intended as a general guide to show which types of materials may contain asbestos.

Source:
United States Environmental Protection Agency

Acoustical Plaster	Fire Door
Adhesives	Fireproofing Materials
Asphalt Floor Tile	Flooring Backing
Base Flashing	Heating and Electrical Ducts
Blown-in Insulation	High Temperature Gaskets
Boiler Insulation	HVAC Duct Insulation
Breaching Insulation	Joint Compounds
Caulking/Putties	Laboratory Gloves
Ceiling Tiles and Lay-in Panels	Laboratory Hoods/Table Tops
Cement Pipes	Packing Materials (for wall/floor penetrations)
Cement Siding	Pipe Insulation (corrugated air-cell, block, etc.)
Cement Wallboard	Roofing Felt
Chalkboards	Roofing Shingles
Construction Mastics (floor tile, carpet, ceiling tile, etc.)	Spackling Compounds
Cooling Towers	Spray-Applied Insulation
Decorative Plaster	Taping Compounds (thermal)
Ductwork Flexible Fabric Connections	Textured Paints/Coatings
Electric Wiring Insulation	Thermal Paper Products
Electrical Cloth	Vermiculite Insulation (Zonolite)
Electrical Panel Partitions	Vinyl Floor Tile
Elevator Brake Shoes	Vinyl Sheet Flooring
Elevator Equipment Panels	Vinyl Wall Coverings
Fire Blankets	Wallboard
Fire Curtains	

What kinds of building materials may contain asbestos?

Product	Location	% of Asbestos	Dates of Use	Binder	Friable Nonfriable	How fibers can be released
ROOFING & SIDING						
Roofing Felts	Flat, Built Up Roofs	10 - 15	1910 - Present	Asphalt	Nonfriable	Replacing, Repairing, Demolishing
Roof Felt Shingles	Roofs	1	1971 - 1974	Asphalt	Friable	Replacing, Demolishing
Roofing Shingles	Roofs	20 - 32	? - Present	Portland Cement	Nonfriable	Replacing, Repairing, Demolishing
Roofing Tiles	Roofs	20 - 30	1930 - Present	Portland Cement	Nonfriable	Replacing, Repairing, Demolishing
Siding Shingles	Siding	12 - 14	? - Present	Portland Cement	Nonfriable	Replacing, Repairing, Demolishing
Clapboards	Siding	12 - 15	1944 - 1945	Portland Cement	Nonfriable	Replacing, Repairing, Demolishing
WALLS & CEILINGS						
Sprayed Coating	Ceilings, Walls, and Steelwork	1 - 95	1935 - 1978	Portland Cement, Sodium Silicate, Organic Binders	Friable	Water Damage, Deterioration Impact
Troweled Coating	Ceilings, Walls	1 - 95	1936 - 1978	Portland Cement, Sodium Silicate	Friable	Water Damage, Deterioration Impact
Asbestos Cement Sheet	Near Heat sources such as Fireplaces, Boilers	20 - 50	1930 - Present	Portland Cement	Nonfriable	Cutting, Sanding, Scraping
Spackle	Walls, Ceilings	3 - 5	1930 - 1978	Starch, Casein, Synthetic Resins	Friable	Cutting, Sanding, Scraping
Joint Compound	Walls, Ceilings	3 - 5	1945 - 1977	Asphalt	Friable	Cutting, Sanding, Scraping
Textured Paints	Walls, Ceilings	4 - 15	? - 1978		Friable	Cutting, Sanding, Scraping
Millboard, Rollboard	Walls, Commerical Buildings	80 - 85	1925 - ?	Starch, Lime, Clay	Friable	Cutting, Demolition
Vinyl Wallpaper	Walls	6 - 8	?		Nonfriable	Removal, Sanding, Dry Scraping, Cutting
Insulation Board	Walls	30	?	Silicates	Friable	Removal, Sanding, Dry Scraping, Cutting

Product	Location	% of Asbestos	Dates of Use	Binder	Friable Nonfriable	How fibers can be released
FLOORS						
Vinyl - Asbestos Tile	Floors	21	1950 - 1980?	Poly (vinyl) - Chloride	Nonfriable	Removal, Sanding, Dry Scraping, Cutting
Asphalt - Asbestos Tile	Floors	26 - 33	1920 - 1980?	Asphalt	Nonfriable	Removal, Sanding, Dry Scraping, Cutting
Resilient Sheet Flooring	Floors	30	1950 - 1980?	Dry Oils	Nonfriable	Removal, Sanding, Dry Scraping, Cutting
Mastic Ashesives	Sheet Flooring and Tile Backing	5 - 25	1945 - 1980?	Asphalt	Friable	Removal, Sanding, Dry Scraping, Cutting
PIPES & BOILERS						
Cement Pipe and Fittings	Water and Sewer Mains	20 - ?	1935 - Present	Portland Cement	Nonfriable	Demolition, Cutting, Removing
Block Insulation	Boilers	6 - 15	1890 - 1978	Magnesium Carbonate, Calcuim Silicate	Friable	Damage, Cutting, Deterioration
Preformed Pipe Wrap	Pipes	50	1926 - 1975	Magnesium Carbonate, Calcuim Silicate	Friable	Damage, Cutting, Deterioration
Corrugated Asbestos Paper	Pipes, High Temp. Moderate Temp.	90 35 - 70	1935 - 1980? 1910 - 1980?	Sodium Silicate, Starch	Friable	Damage, Cutting, Deterioration
Paper Tape	Furnaces, Steam Valves, Flanges, Electrical Wiring	80	1901 - 1980?	Polymers, Starches, Silicates	Friable	Tearing, Deterioration
Putty (mudding)	Plumbing Joints	20 - 100	1900 - 1973	Clay	Friable	Water Damage, Cutting, Deterioration

Source: United States Environmental Protection Agency.

Appendix 2 CONTACTS LIST

Safety

Workers Safety and Compensation Commission of the Northwest Territories

Senior Safety Officer	Telephone:	867-669-4403
	Toll Free:	800-661-0792
	Fax:	867-873-4596
	Toll Free Fax:	866-277-3677

Transportation and Disposal

Environment and Natural Resources, Environmental Protection Service

Hazardous Substances Specialist	Telephone:	867-873-7645
	Fax:	867-873-0221

Public Works and Services

Departmental Asbestos Coordinator	Telephone:	867-920-8835
		867-920-8088
	Fax:	867-873-0226
Fort Smith Regional Superintendent	Telephone:	867-872-7401
	Fax:	867-872-2830
Inuvik Regional Superintendent	Telephone:	867-777-7140
	Fax:	867-777-3463
North Slave Regional Superintendent	Telephone:	867-873-7650
	Fax:	867-873-0257
Ft Simpson Area Director	Telephone:	867-920-3447
	Fax:	867-873-0100

Appendix 3 - Laboratories

PHH ARC ENVIRONMENTAL
200, 9707 – 110 STREET
EDMONTON, AB T5K 2L9
email scoen@phharcenv.com
Tel: 780-425-6600 Ext 241

ENVIROWORKS
1224 KLARVATTEN COURT
EDMONTON, AB T5Z 3N4
Tel: 780-457-4652

ENVIROTEST LABORATORIES
9936-67th AVENUE
EDMONTON, AB T6E 0P5
Tel: 780-413-5227
800-668-9878

PSC ANALYTICAL
4619-42nd AVENUE
EDMONTON, AB T6E 5R2
Tel: 780-465-1212
800-668-9878

Appendix 3
LABORATORIES

Appendix 4
CONTRACTOR NOTIFICATION DOCUMENT

Northwest Territories Public Works and Services

CONTRACTOR NOTIFICATION AND ACKNOWLEDGEMENT OF HAZARDOUS MATERIALS

I hereby acknowledge that I have been notified of and am aware that the GNWT Asset buildings on the attached list contains Hazardous Material, specifically:

_____

Located in Room(s) and/or Area(s) of the Asset: _____

_____

and that proper procedures must be followed while working with this material or in these buildings. Specialized safety equipment and training of workers may be required depending on the scope of work identified.

_____

_____

_____

Date: _____ Contract #: _____

Contractor Signature: _____ Title: _____

PW&S Signature: _____ Title: _____

Appendix 5 EMERGENCY REPAIRS

Emergency Response and Repair Procedures

Asbestos emergency situations may occur at any time due to water damage, physical damage, or any other damage which might cause the release of asbestos fibres in the air and could pose a hazard to human health and the environment. Any damage to asbestos materials requires special attention, and certain emergency procedures must be followed at such times. The following are lists of procedures to be followed by the building occupants, employees, the Maintenance Coordinator and the Regional Asbestos Coordinator, in an asbestos emergency event.

Damage to known ACM (asbestos containing materials), where the possibility exists that a release of airborne fibre could occur or have occurred, are to be managed by having building occupants:

A. Immediately stop all activities that may further disturb the damaged material.

B. Vacate the affected area.

C. Isolate the affected area the best possible way through restricting access into and out of the affected area, and closing doors. This can be done by locking doors and posting signs or by stationing monitors to prevent access.

D. Notifying the Program Manager, PWS Facility Manager Maintenance Coordinator and other affected or applicable departmental building management.

PWS staff (wearing appropriate Personal Protective Equipment) will contain the damage and fibre release by:

A. Turning off ventilation equipment or other wise restrict air flow in the affected area. Even with equipment turned off air grills and louvers are to be sealed to prevent fibre migration into the ventilation system.

B. Coordinating immediate access to responding abatement staff, consultants or contractors.

C. Expanding the control area if necessary.

D. Notifying WSCC of the damage and steps being taken.

E. Having trained asbestos worker(s), under the guidance and coordination of the Regional Asbestos Coordinator, clean up the affected area and make any necessary repairs. When possible, repairs are to be done when the building is not occupied.

F. Conduct air sampling including clearance sampling.

Where minor damage has occurred but fibre release is not evident steps should be taken to prevent further damage. For example where small bumps have resulted in dents or cracking of wallboard and ACM is known to exist in the drywall compound, immediate steps should be taken to ensure no further damage occurs.

This can be as simple as ensuring persons cannot be in contact with the affected material.

PWS will send trained workers (wearing personal protective equipment) to perform temporary repairs or install temporary containment material.

Proper repairs will be performed while the building is not occupied. Bulk samples will be taken for analysis.

Appendix 6

References

CONSOLIDATION of ASBESTOS SAFETY REGULATIONS

Available online at:
http://www.justice.gov.nt.ca/PDF/REGS/SAFETY/Asbestos-Safety.pdf

GUIDELINE FOR THE MANAGEMENT OF WASTE ASBESTOS

Available online at:
http:www.enr.gov.nt.ca/library/pdf/eps/asbestos2.pdf

ASBESTOS MANAGEMENT PLAN FOR GNWT BUILDINGS
(Operated and Maintained by PWS).
Prepared by Technical Support Services, Asset Management Division,
PWS in consultation with the Workers' Compensation Board.
May 10, 2000

ASBESTOS MANAGEMENT FOR GNWT ASSETS
(Maintained by PWS), INSPECTION REPORT 2001-2002,
Prepared by Technical Support Services, Asset Management Division,
PWS, August 2002.

Acknowledgements

Information in this document came from numerous sources.

Our Appreciation to:

Province of New Brunswick,

The Resilient Flooring Covering Institute and

Arctic Environmental Services Ltd.

And a special thanks to WSCC for their assistance and cooperation.

These guidelines are intended to provide assistance to the Department of Public Works and Services and project staff while completing projects involving asbestos containing material, to ensure the protection of both workers and building occupants, as well as to comply with regulatory requirements.

Disclaimer

The material presented in this document has been prepared in accordance with generally recognized engineering principles and practices, and is for general information only. This information should not be used without first securing competent advice with respect to its suitability for any general or specific application.

Neither the GNWT, nor any employee thereof, shall under any circumstances whatsoever be under any liability whatsoever to any person for any loss, damage or expenses of whatever nature or kind arising or resulting directly or indirectly, whether in contract or in tort, from reliance on the accuracy or completeness of the information contained in this document.

Appendix 7