



**Edmonton Waste Management  
Centre of Excellence**

# **Guidelines for Managing Asbestos Waste in Alberta**



Spring, 2017

## Objectives and Scope of this Document

1. Provide answers to frequently asked questions.
2. Provide summaries and links to relevant legislation and guiding documents.
3. Provide a resource for managers and owners of waste management facilities outlining safe management and handling of asbestos waste.
4. Provide examples of industry best practices regarding safe management and handling of asbestos waste.
5. Provide sample standard operating procedure (SOP) templates.

## Acknowledgements

Funding for this project was provided by Alberta Occupational Health and Safety. EWMCE acknowledges and appreciates their generous support. The contents of this document are the responsibility of EWMCE.

EWMCE would like to thank the Alberta Solid Waste Industry for their support of this project, their input at the regional round tables, and their considerable expertise.

EWMCE would like acknowledge Pam Haggarty for her dedication to this project. Her passion and enthusiasm combined with her Industry contacts made this project possible.

## Table of Contents

Table of Charts and Figures.....	2
Table of Sample Documents and Information .....	2
Industry Terms .....	3
What is Asbestos? .....	6
When is Asbestos a Cause for Concern? .....	8
What Makes Asbestos a Health Risk? .....	8
Where to Find Asbestos .....	11
EPA Asbestos Containing Materials .....	13
Asbestos Waste Chain of Custody .....	15
Alberta Occupational Exposure Limits .....	29
Employer Responsibilities .....	29
Worker Responsibilities .....	29
Site-level Code of Practice .....	30
Resources .....	41

## Table of Charts and Figures

Asbestos Mineral Classifications .....	6
Friable and Non-Friable Examples .....	7
Human Respiratory System.....	8
OHS Code of Practice: Schedule 1, Table 1 .....	19
Risk Classification Matrix .....	29
Risk Classification and Controls Matrix.....	40
Hierarchy of Controls .....	40

## Table of Sample Documents and Information

Sample Demolition Permit .....	16
Sample Shipping Document.....	24
Asbestos Waste Code of Practice .....	27
Sample Site Level Code of Practice from the City of Calgary.....	31
Generator Decision Making Tree .....	37
Sample Disposal Request .....	38

## Industry Terms

<b>Abatement</b>	Procedures to encapsulate, enclose, or remove asbestos-containing material.
<b>Administrative Controls</b>	Policy, procedure or practice that alters the way work is performed (standard operating procedure, training, signage, etc.).
<b>Air Monitoring</b>	The process of measuring airborne fiber levels in a specified area over time. This involves drawing a known volume of air through a filtered cassette with an effective pore size, counting the fibres that collect on the filter, and expressing the result as fibres per cubic centimeter (f/cc).
<b>Amended Water</b>	Water that is used during asbestos removal to reduce airborne fibre generation. This water has non-ionic surfactant added to it which allows for more thorough wetting of asbestos fibers by reducing the water's surface tension.
<b>Amosite (Brown Asbestos)</b>	A type of amphibole asbestos used in sprayed coatings and in heat insulation products having long straight fibres.
<b>Approved Permit Package</b>	Permit that has been updated with all the necessary information: permit number, name, type of asbestos, etc.
<b>Asbestos</b>	A generic name given to several naturally occurring hydrated mineral silicates that are incombustible, separated into fibres, and have a unique crystalline structure. Asbestos minerals include actinolite, amosite, anthophyllite, chrysotile, crocidolite, and tremolite.
<b>Asbestos Waste</b>	Discarded waste containing asbestos in a concentration greater than 1% by weight. There is a reasonable chance that asbestos might be released and become airborne.
<b>Asbestos-Containing Material (ACM)</b>	A composite material that has less than 1% asbestos, but has a reasonable chance to release asbestos fibres when disturbed.
<b>Asbestosis</b>	A fatal lung disease caused by the inhalation of high concentrations of asbestos fibres, leading to a build-up of tissue around the fibres. It is a chronic lung disease with symptoms including coughing, weight loss, and difficulty breathing.
<b>Bulk Sample</b>	A representative sample taken of any material that is suspected of containing asbestos.
<b>Chrysotile (White Asbestos)</b>	A serpentine mineral having long wavy fibres that are white or off-white. It is the most commonly used form of asbestos in Canada and is found in approximately 90% of asbestos-containing products.
<b>Competent</b>	Possessing knowledge, experience, and training to perform a specific duty.
<b>Containment</b>	An isolation system designed to effectively contain asbestos fibers within a designated work area where asbestos-containing materials are handled, removed, encapsulated, or enclosed. Glove bags are a type of containment.
<b>Contaminated Item</b>	Any object that has been exposed to airborne asbestos fibres without being sealed off, isolated, or cleaned.
<b>Contractor</b>	A person, partnership, or group of persons who has a contract to work with one or more employers; a self-employed person involved in work at a place of employment; or retaining an employer or self-employed person to perform work at a place of employment
<b>Crocidolite (Blue Asbestos)</b>	A type of amphibole asbestos having long, straight fibres, commonly used for fire protection and for heat or noise insulation. It was also used in gasket materials and asbestos cement products.

<b>Decontamination Facility</b>	An area constructed to prevent the spread of asbestos fibres beyond the work area. It is a series of rooms consisting of a dirty room, shower room, equipment transfer area, and clean room. Decontamination facilities may be constructed for personnel leaving the work area or wastes that must be removed from work area.
<b>Dioctyl Phthalate (DOP) Testing</b>	Testing of equipment fitted with HEPA filters such as vacuum cleaners and negative pressure units after filter installation has been completed. An aerosol of Dioctyl Phthalate (DOP) is introduced on the upstream side of the HEPA unit. If aerosol particles are detected on the downstream side, the unit is shut down and inspected and/or repaired. The particles generated are 0.3 micrometres in diameter or larger. The test is used to determine whether there are imperfections in the filter or in the seal between the filter and the cabinet frame. When a photometer detects signs of leakage exceeding 0.03 %, the filter must be repaired or changed and equipment retested.
<b>Dust</b>	Finely divided particles of asbestos.
<b>Employee</b>	Anyone who works for an SWM operation for salary or wages (e.g. senior managers, managers, supervisors, and workers).
<b>Employer</b>	A person, firm, association or body that operates a place of work that employs one or more workers.
<b>Engineering Controls</b>	Preferred method of hazard control if elimination or substitution is not possible. Physical controls are implemented at the design, installation, or engineering stages (e.g. guards, auto shutoff, ventilation, etc.).
<b>Exposure Control Plan</b>	Explains the work practices, procedures, and other controls that will be used to reduce workers' risk of asbestos exposure.
<b>Friable Asbestos Waste</b>	Asbestos waste which is easily crumbled by hand or finger pressure. Friable material can also be released when handled with heavy equipment or dropped down waste disposal chutes. The more friable the material, the greater the potential hazard due to fiber release.
<b>Generator/Customer</b>	Person or company disposing of asbestos.
<b>Hazard</b>	A situation, condition, or object that has the potential to cause an injury or loss.
<b>HEPA Filter</b>	Defined in the Regulation as a high-efficiency particulate air filter that is at least 99.97% efficient in collecting an aerosol particle 0.3 micrometres in size. Any HEPA filters used for asbestos applications must be at least 99.97% efficient. When used for respiratory protection, HEPA filters are now referred to as NIOSH P100 HEPA series filters, or "P100" filters for short.
<b>Owner</b>	A trustee, receiver, mortgagee in possession, tenant, lessee or occupier of any lands, premises or infrastructure that has been used, is used or may be used as a place of employment; and any person who acts for or on behalf of a person mentioned as that person's agent or delegate.
<b>Personal Protective Equipment (PPE)</b>	Specialized clothing or equipment worn by employees for protection against health and safety hazards. PPE is designed to protect many parts of the body (eyes, ears, face, hands, body, skin, lungs, and feet).
<b>Respirator Protective Equipment (RPE)</b>	A device worn to prevent the inhalation of hazardous airborne substances. There are two basic types of respirators: air purifying and air supplying. "Single-use" or "disposable" respirators are not acceptable for working with asbestos.
<b>Safety Critical Task</b>	A task with high potential for serious loss or injury.

---

<b>Sanitary Landfill</b>	A waste management facility where waste material is: <ul style="list-style-type: none"><li>i) placed in trenches or on land;</li><li>ii) compacted by force applied by mechanical equipment; and</li><li>iii) covered with earth.</li></ul>
<b>Standard Operating Procedure (SOP)</b>	Standard operating procedures (SOPs) are a detailed explanation of how a policy is to be implemented. The SOP may appear on the same form as a policy or it may appear in a separate document. The main difference between a SOP and a policy are details. Effective SOPs communicate: who will perform the task, what materials are necessary, where the task will take place, when the task shall be performed, and how the person will execute the task.

---

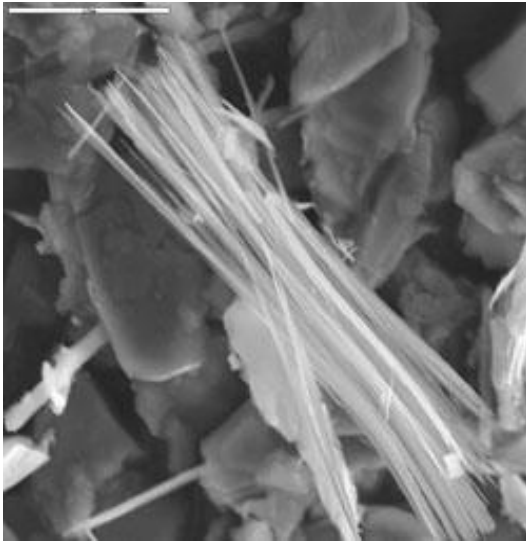
## What is Asbestos?

Asbestos is a mineral found in veins of rock and is mined in open pits. There are several types of asbestos that can be divided into two mineral classifications: amphibole and serpentine.

### Asbestos Mineral Classifications

#### Amphibole

- Amosite (brown)
- Crocidolite (blue)
- Tremolite
- Actinolite
- Anthophyllite



**Figure 1: Tremolite**

#### Serpentine

- Chrysotile (white)



**Figure 2: Chrysotile**

Most asbestos products contain Chrysotile, but Vermiculite contains Tremolite and/or Actinolite whereas Amosite is used in some applications, like spray-applied fireproofing. Crocidolite is rarer and very infrequently encountered.

Initially, the dangerous characteristics of asbestos were not known and it had many properties that made it seem like an ideal construction material. Asbestos was so popular because it is:

- Strong, durable & flexible fibers;
- Non-flammable at high temperature;
- Non-corrosive & chemically stable;
- A great insulating material (heat/electricity); and
- Acoustically dampening (useful in noise control).



#### DID YOU KNOW?

- Because of its strength and resistance to fire and chemicals, asbestos was often used as an ingredient in a wide range of construction products from children's pajamas to break pads?
- Asbestos can be in any house or building built before the year 1990?

Airborne asbestos fibers range from 0.10 to 0.25 micrometers in diameter (~100x less than a human hair). Asbestos containing material (ACM) is hazardous when it is releasing fibers into the air where it can be inhaled.

**Left alone, asbestos is not dangerous however, once disturbed, tiny fibers are released and if inhaled can have lasting health effects.**

The risk of fibres releasing from asbestos depends on if it is friable or non-friable:

- *Friable*: readily releases asbestos fibres when disturbed, or
- *Non-friable*: will not release asbestos fibers unless they are cut, sanded, or damaged in some way.



**Friable and Non-Friable Examples**

Friable ACM		Non-friable ACM	
	<b>Mechanical Insulations</b>		<b>Gaskets</b>
	<b>Sheet vinyl flooring paper back</b>		<b>Vinyl Floor Tiles</b>
	<b>Ceiling Tiles</b>		<b>Black Mastic Backing</b>
	<b>Vermiculite Insulation</b>		<b>Transite Cement Products</b>

## When is Asbestos a Cause for Concern?

Asbestos must be inhaled to cause disease so asbestos materials in good condition (fibers nicely packed in binder matrix, no friability or damage) are of little concern. However, damaged asbestos materials (friable, delaminated matrix) must be immediately remediated if exposure to friable ACM cannot be controlled. It is best to have a competent person trained in asbestos work do any risk/exposure assessment. Air monitoring for fibers will evaluate exposure potential.

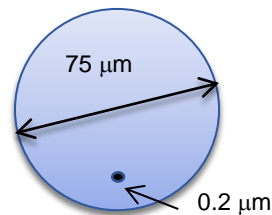
## What Makes Asbestos a Health Risk?

Man-made fibers (e.g. fiberglass) **do not** break lengthwise but break in the middle and become shorter.

Asbestos fibers split lengthwise and become thinner, shorter, & microscopic

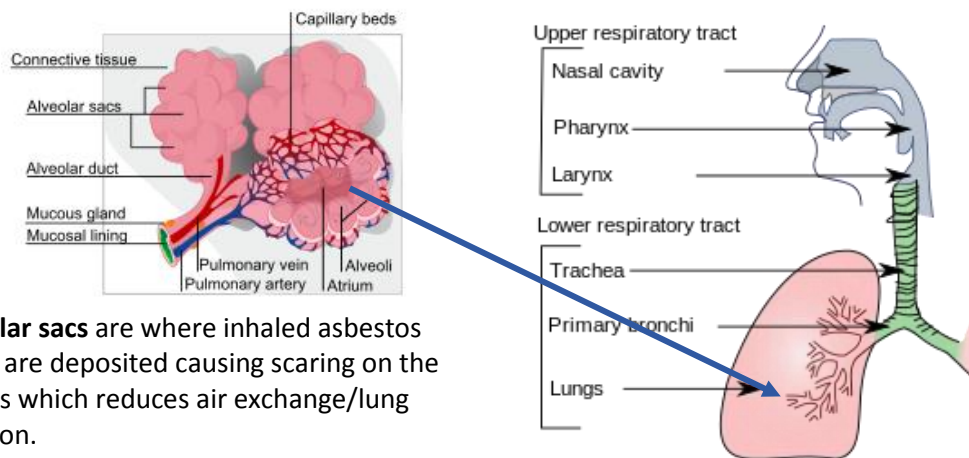


- Asbestos: 0.11 to 0.24  $\mu\text{m}$  diameter
- Human hair: 75  $\mu\text{m}$  diameter



These small fibers can become airborne when any ACM is disturbed. These asbestos fibers (< 5  $\mu\text{m}$ ) can remain airborne for several hours and are easily inhaled. Larger particles (>5  $\mu\text{m}$ ) deposit in the **nose**, **throat**, and **larynx** region. Smaller particles (0.01 – 5  $\mu\text{m}$  diameters) reach the **bronchioles** and **alveoli** (air sacs) causing the scar tissue around the fibre. Once inhaled the small fibers can become trapped in the lungs for many years. Because asbestos fibres are essentially a rock, they don't break down once inhaled and lodged inside the alveoli.

## Human Respiratory System



**Alveolar sacs** are where inhaled asbestos fibres are deposited causing scarring on the tissues which reduces air exchange/lung function.

## The Human Defense System

The human body does have some natural defenses against inhaling foreign particles:

- **Mucociliary Elevation:** Tiny hairs sweep particles trapped in mucous upwards to the throat where they are cleared out and swallowed.
- **Macrophages:** Surround & break down particles to clear the lungs.

However, the asbestos fibres can be small enough to pass the natural defense system, and once inhaled the macrophages are unable to break down asbestos fibers. Asbestos fibers accumulate in the deep lungs in the **alveoli**, scar tissue forms leading to reduced air exchange and lung function.

## Diseases Related to Asbestos Exposure

This long term build up in the lungs can cause three types of disease.

1. **Asbestosis:** Irreversible, fatal disease where lung scarring causes difficulty breathing & coughing.
  - Symptoms: dry cough & shortness of breath
  - 10 – 20 years to develop
2. **Lung Cancer:** the uncontrolled growth of abnormal cells that start off in one or both lungs; usually in the cells that line the air passages.
  - Dependent on frequency and duration of exposure.
  - Exposure of 4 – 6 months may be sufficient to cause lung cancer
  - 15 – 25 years to develop
3. **Mesothelioma:** rare cancer of the membranes lining the lungs, chest cavity, or abdomen.
  - Up to 35 years to develop
  - Time to develop NOT related to amount of asbestos exposure

**THERE ARE NO TREATMENT OPTIONS FOR ASBESTOS-RELATED LUNG DISEASES.**  
**PREVENTING EXPOSURE IS ESSENTIAL.**

4. **Asbestos Corn:** Fibers could become lodged in the skin during handling, producing a callus or corn.

## Asbestos Disease Factors

Any one person's risk of developing an asbestos disease is dependent on several factors:

- Duration and concentration of the exposure,
- Size, shape, and type of asbestos fiber,
- Presence of other lung diseases, and
- If the person is a smoker.

Smoking paralyzes mucociliary elevation so particulates are not removed from the upper respiratory tract. This significantly increases risk of disease (50 – 100 times).



## Relative Risk for Developing Lung Cancer Compared with the Risk of Dying from Lung Cancer for a Nonsmoker not Exposed to Asbestos



Source: Report of the Surgeon General, 1985

79

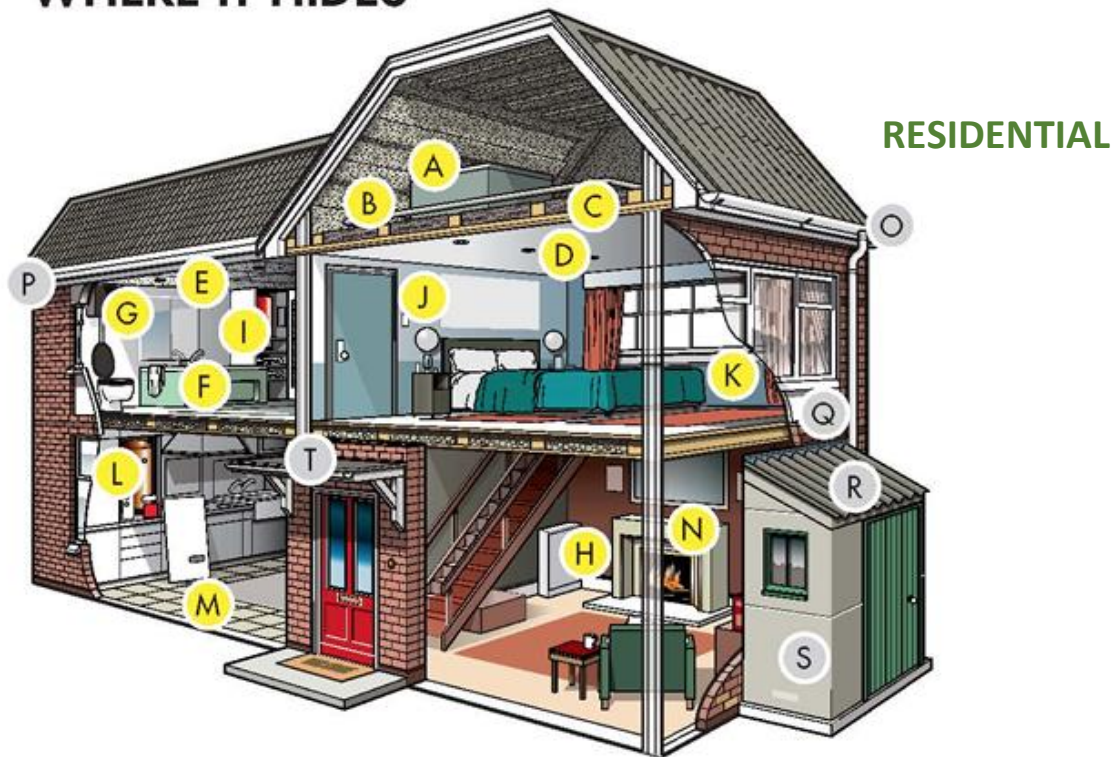
**Table 6.11 Occupational Disease Fatalities Accepted by the WCB,  
by Source of Disease – Alberta: 2005-2009**

Source of Fatality	2005	2006	2007	2008	2009	Number of Fatalities	%
Persons, Plants, Animals or Minerals	46	48	54	55	40	243	83.5%
Asbestos	43	40	47	49	39	218	74.9%
Silica*	1	4	3	2	1	11	3.8%
Coal Dust	2	1	0	1	0	4	1.4%
Grain Dust	0	2	2	1	0	5	1.7%
Other Persons, Plants, Animals or Minerals	0	1	2	2	0	5	1.7%

Source: Alberta Employment & Immigration, Work Safe Alberta, Occupational Fatalities and Fatality Rates, 2005 to 2009

## Where to Find Asbestos

# ASBESTOS WHERE IT HIDES

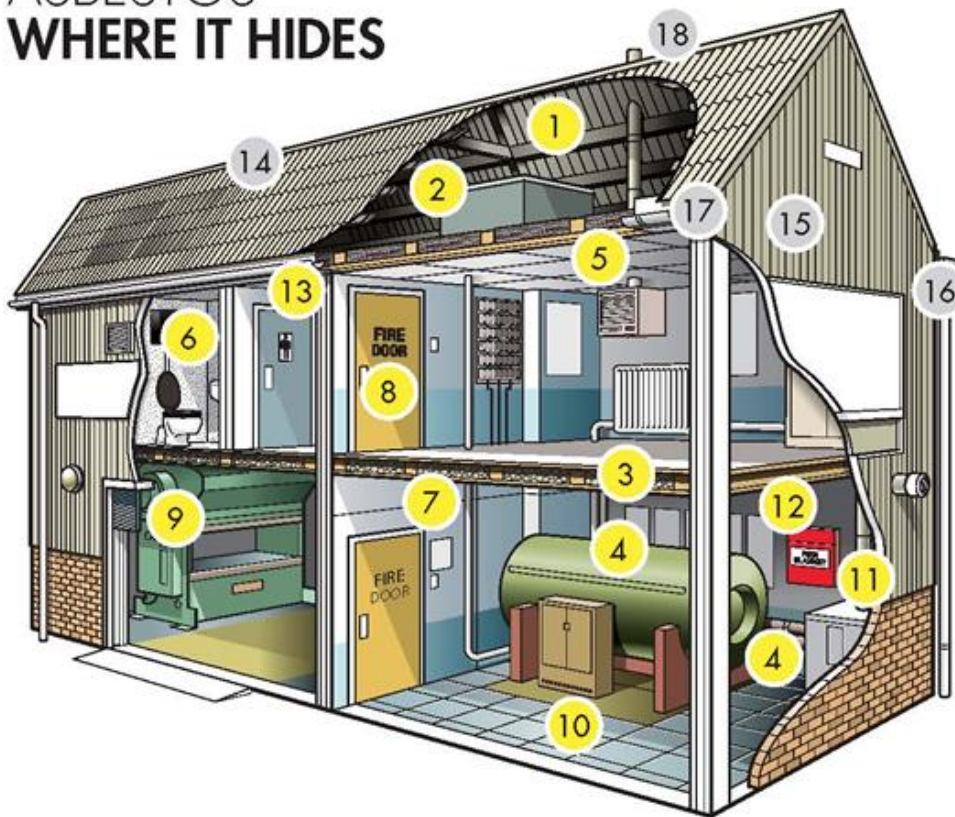


## RESIDENTIAL

<http://www.carymar.co.uk/ekmps/shops/7c3b8f/resources/Design/screen-shot-2015-05-05-at->

INSIDE		OUTSIDE
A. Asbestos cement water tank	I. ACM sprayed insulation coating on boiler and hot water tank	O. Asbestos cement gutters and down spouts
B. Pipe lagging	J. ACM partition wall	P. Soffits
C. Loose fill insulation (blown in insulation)	K. ACM interior window panel	Q. Exterior window panel
D. Texture decorative coating	L. ACM around boiler	R. Roof panels
E. ACM ceiling tiles	M. Vinyl floor tiles, linoleum sheet flooring	S. Cement panels
F. ACM bath panel	N. Fire resistance board behind fireplace and/or under woodstove	T. Shingles
G. Toilet seat and cistern		
H. ACM behind fuse box		

# ASBESTOS WHERE IT HIDES



## COMMERCIAL

<http://www.hse.gov.uk/asbestos/building.htm>

INSIDE		OUTSIDE
1. Sprayed coating on ceilings, walls, beams, and columns	8. ACM panels in fire doors	14. Asbestos roof tiles and roof felt liners
2. Asbestos cement water tank	9. Asbestos rope seals, gaskets, and paper	15. Asbestos cement panels
3. Loose fill insulation	10. Vinyl floor tiles, linoleum sheet flooring	16. Asbestos cement gutters and down spouts
4. Lagging on boilers and pipes	11. ACM around boilers, pipes	17. Soffits
5. ACM ceiling and acoustic tiles	12. Textiles – fire blankets	18. Asbestos cement flue
6. Wall board	13. Textured decorative coating on walls and ceilings	
7. ACM partition walls		

## EPA Asbestos Containing Materials

Product	Location	%of Asbestos	Dates of Use	Binder	Friable Nonfriable	How fibres can be released
<b>ROOFING &amp; SIDING</b>						
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
<b>WALLS &amp; CEILINGS</b>						
Sprayed coating	Ceilings, walls, & 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 i.e. fireplace boilers	20-50	1930-present	Portland cement	Nonfriable	Cutting, sanding, scraping
Spackle	Ceilings, walls	3-5	1930-978	Starch, casein, synthetic resins	Friable	Cutting, sanding, scraping
Joint compound	Ceilings, walls	3-5	1945-1977	Asphalt	Friable	Cutting, sanding, scraping
Textured paints	Ceilings, walls	4-15	?-1978		Friable	Cutting, sanding, scraping
Millboard, Rollboard	Walls, commercial 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
<b>FLOORS</b>						
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 Adhesives	Sheet flooring, tile backing	5-25	1945-1980?	Asphalt	Friable	Removal, sanding, dry scraping, cutting

Product	Location	%of Asbestos	Dates of Use	Binder	Friable Nonfriable	How fibres can be released
<b>PIPES &amp; BOILERS</b>						
Cement pipe & fittings	Water & sewer mains	20-?	1935-present	Portland cement	Nonfriable	Demolition, cutting, removing
Block insulation	Boilers	6-15	1890-1978	Magnesium, carbonate, calcium silicate	Friable	Demolition, cutting, deterioration
Preformed pipe wrap	Pipes	50	1926-1975	Magnesium, carbonate, calcium silicate	Friable	Demolition, cutting, deterioration
Corrugated asbestos paper	Pipes: high/moderate temperature	90 35-70	1935-1980? 1910-1980?	Sodium silicate, starch	Friable	Demolition, 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 Protection Agency

## Asbestos Waste Chain of Custody



Pre-Demolition



Demolition/Renovation



Abatement/Removal



Disposal Preparation



Disposal Transport



Disposal



# Pre-Demolition

Several municipalities use the permitting process to help educate home owners and demolition companies about the potential danger of asbestos, what age of buildings are most prone to have ACM, and will provide a list of local abatement companies who can test for and safely remove ACM.

## Sample Demolition Permit



Updated 2016 February 09

LUD	_____
PST	_____

### Building Permit Application Requirement List

#### Permit to Demolish or Move a Building

All of the following information is necessary to facilitate a thorough evaluation and timely decision on your application. To expedite the evaluation, all materials submitted must be clear, legible and precise. To achieve this level of customer service, staff has been instructed to accept only complete applications which **include plans prepared to professional drafting standards**. We are currently unable to accept digital applications. Thank you for your cooperation.

**NOTE:** Building and Development Permit applications must be submitted without personal information on any plans. Omitting this information will protect builders and tenants by reducing the risk of any personal information being wrongfully displayed, while also following the Province of Alberta's FOIP Act. Failure to follow this requirement may result in an incomplete application. If you consider the information to be personal, do not put it on the plans.

completed by applicant	office use only	Required Items
<input type="radio"/>	<input type="radio"/>	<b>Prerequisites, where applicable:</b>
		1. Fee ( <a href="#">Fee Schedule</a> )
		<b>Permit Documents:</b>
<input type="radio"/>	<input type="radio"/>	2. Completed <a href="#">Public Tree Disclosure Statement</a>
<input type="radio"/>	<input type="radio"/>	3. Completed <a href="#">Asbestos Abatement Form</a>
<input type="radio"/>	<input type="radio"/>	4. A <a href="#">Letter of Authorization</a> from the registered owner of the land.
<input type="radio"/>	<input type="radio"/>	5. <b>Colour Photographs</b> of the front and rear elevations of the building to be removed.
<input type="radio"/>	<input type="radio"/>	6. <b>Total size (square footage) of all floors</b> of the building to be removed.
<input type="radio"/>	<input type="radio"/>	7. <b>Name of licensed contractor or Building Mover</b> responsible for demolition/moving.
		<b>Architectural Documents:</b>
<input type="radio"/>	<input type="radio"/>	8. Two (2) copies of a <b>Dimensioned Site Plan</b> of existing building (Preferred scale is Metric 1:200 or Engineer 1" = 20' 0") including:

Updated 2017 February 13



Building Permit # \_\_\_\_\_  
 or  
 Demolition Permit # \_\_\_\_\_

## Asbestos Abatement Information Form

In buildings to be renovated or demolished, materials having the potential for releasing asbestos fibres shall be removed prior to renovation or demolition. Refer to the reverse side of this form for additional information.

This form must be completed and submitted to The City of Calgary prior to building permit or demolition permit release.

Project name: \_\_\_\_\_

Project address: \_\_\_\_\_

Legal Description: \_\_\_\_\_

- I hereby give assurance that all **materials having the potential for releasing asbestos** fibres have been removed from the **project area** to be renovated or demolished. I confirm that waste materials have been disposed of in an approved landfill site as required by Alberta Environment.

**OR**

- I hereby give assurance that there are no **materials having the potential for releasing asbestos** fibres in the **project area** to be renovated or demolished.

(check box that is applicable)

Name (print) \_\_\_\_\_ Signature \_\_\_\_\_

Representing Firm \_\_\_\_\_



## Demolition/Renovation

All ACM that can release fibres during the demolition must be removed safely. Regulations provide guidance for how to prepare Codes of Practice that describe procedure and process for ACM demolition.

### Occupational Health and Safety (OH&S) Code of Practice

Section 26(1) An employer must have a code of practice governing the storage handling, use and disposal of a substance listed in Schedule 1. Table 1 that is present at the worksite

- (a) as pure substance or in an amount exceeding 10 kilograms or,
- (b) in a mixture in which the amount of the substance is more than 10 kilograms and at a concentration of 0.1 percent by weight or more

Section 28 General provisions for asbestos, silica, coal dust, and lead. An employer must:

- (a) minimize the release of asbestos, silica, coal dust, and lead into the air as far as it is reasonably practicable,
- (b) keep the work site clear of unnecessary accumulations of asbestos, silica, coal dust, and lead and waste materials containing any of these substances.

If asbestos, silica, coal dust, or lead are present, there should be:

- Signage
- A restriction for authorized workers only
- Prohibitions on eating, drinking, smoking
- Appropriate protective clothing for authorized workers
- A method to ensure that workers' street clothing is not contaminated

### Code of Practice for Chemical Hazards

Consider asking the Generator for their Code of Practice for Chemical Hazards which should include:

- When and where workers may be exposed to the chemical,
- Controls and work procedures to prevent exposure to the chemical,
- Protocols to address emergency situations and releases,
- Decontamination procedures,
- Methods to handle and control wastes,
- Training requirements and training resources,
- Protocols for follow up and monitoring, and
- Site contacts.

## OHS Code of Practice: Schedule 1, Table 1

Occupational Health and Safety Code 2009

Schedule 1

### Schedules

#### Schedule 1 Chemical Substances

**Table 1** Substances and processes requiring a code of practice  
[See subsection 26(1)]

- Arsenic and arsenic compounds
- Asbestos
- Benzene
- Beryllium
- 1,3-Butadiene
- Cadmium
- Coal tar pitch volatiles
- 1,2-Dibromoethane (Ethylene dibromide)
- Ethylene oxide
- Hexachlorobutadiene
- Hydrazines
- Hydrogen sulphide
- Isocyanates
- Lead and lead compounds
- Methyl bromide
- Methyl hydrazine
- Perchlorates
- Silica-crystalline, respirable
- Styrene in styrene resin fabrication
- Vinyl chloride (Chloroethylene)
- Zinc chromate



## Abatement/Removal

The responsibilities of demolition and abatement companies are described in Part 4, sections 37 and 38 of the Alberta Occupational Health and Safety Code.

### Asbestos Worker Course

37(1) An employer must ensure that a worker who works with asbestos receives the training necessary for the worker to perform the work safely.

37(2) An employer must ensure that a worker who enters a restricted area that is designated as a restricted area due to the presence of asbestos

- (a) has successfully completed a course of instruction approved by a Director of Occupational Hygiene, and
- (b) has in the worker's possession the original valid certificate of completion of the course issued to the worker.

### Release of Asbestos

#### OHS Code of Practice

31(1) If it is determined that asbestos fibres may be released in a building, the building is in an unsafe condition.

31(2) The employer must take all necessary steps to correct the unsafe condition.



## Disposal Preparation

### Containment and Labelling of Asbestos Waste

38(1) An employer must ensure that asbestos waste is stored, transported and disposed of in sealed containers that are impervious to asbestos and asbestos waste.

38(2) An employer must ensure that a container of an asbestos product and asbestos waste is clearly labelled

- (a) to identify the contents as an asbestos product and carcinogenic, and
- (b) to warn handlers that dust from the contents should not be inhaled.

**Danger: Contains Asbestos**  
**Do Not Inhale Fibres**  
**Cancer and Lung Disease Hazard**

Failure to comply with these sections put workers at risk unnecessarily along the entire chain of custody.

No person should allow asbestos waste to leave the location at which it is generated unless:

- i. the asbestos waste is in a rigid, impermeable, sealed container of sufficient strength to accommodate the weight of the friable asbestos waste; or
- ii. the asbestos waste is double bagged within two 6-mil polyethylene bags; or
- iii. the asbestos waste is packaged in accordance with a method approved in writing by the Director of Standards and Approvals of Alberta.

### Environment

Every container referred to above must be free from punctures, tears or leaks, and should be clearly labeled as follows:





## Transportation of Waste Asbestos

According to Alberta Environment and Parks, shipping waste asbestos does not require a Provincial Waste Manifest as long as the following conditions are met:

- The waste asbestos is in double bags, well-covered and transported according to the TDG Regulations; and
- The landfill site that the waste is shipped to has been given notification about the shipment and has agreed to receive it.

Regulations applicable to how the waste is transported require that:

- bags are marked with a shipping name and PIN number;
- the shipment vehicle is placarded;
- the vehicle operator has a valid Certificate of Training issued by the operator's employer (a Transportation of Dangerous Goods training course is usually taken);
- asbestos is transported as directly as possible to the disposal site;
- asbestos is not transported with any other cargo in the same vehicle;
- asbestos is not mixed with other types of waste; and
- asbestos is not transported in a compaction type of waste haulage vehicle.

The external surfaces of every container and of every vehicle or vessel used for the transport of asbestos waste must be free of asbestos waste. Asbestos waste must be properly secured and transported within an enclosed vehicle or covered by a tarpaulin or net if transported in a vehicle which is not enclosed.

Friable asbestos waste should only be transported in vehicles equipped with emergency spill clean-up equipment that includes a shovel, a broom, wetting agent, protective clothing, a supply of 6 mil thick polyethylene bags, bag closures and approved respiratory protection.

*Friable asbestos should never be transported in compaction vehicles.*

Friable waste that leaks from a container during transport must be collected and double bagged in 6 mil thick polyethylene bags immediately upon discovery. If possible, punctured and broken containers should also be double bagged in 6 mil thick polyethylene bags.



Although asbestos waste does not require a manifest, a shipping document must accompany the waste to the landfill. This document must include the following information:

- (a) a document identification number that is legible and indelibly printed;
- (b) the date;
- (c) the name and address of the shipper;
- (d) the shipper's signature;
- (e) the name and address of the receiver (landfill);
- (f) the name of the initial carrier (transporter of the waste);  
and
- (g) a description of the dangerous goods in the following order:
  - i. the proper shipping name of the product (asbestos: white for chrysotile, brown for amosite, blue for crocidolite);
  - ii. the dangerous goods class (9.4);
  - iii. the Product Identification Number (PIN) [UN 2590 for chrysotile, UN 2212 for all others];
  - iv. the packing group (III);
  - v. the number of packages, where applicable, and the total weight or volume of each type of dangerous good;
  - vi. any special handling instructions;
  - vii. a 24-hour emergency telephone number where information concerning damaged or defective packages may be obtained; and
  - viii. an indication of the types and number of placards required.



Any quantity above 500 kg will require a complete dangerous goods shipping document. It is the responsibility of the consignor to prepare a proper shipping document when offering dangerous goods for transportation [Section 3.1]. The document is similar to a standard bill of lading but must contain information needed to describe the dangerous goods. The shipping document is handed over to the initial carrier and must accompany the consignment throughout its journey. The consignor and each carrier that transported shall retain a copy of the shipping document for a period of two years [Section 3.11].

Any friable asbestos waste which leaks from a container during transportation should be collected and double bagged in two six mil polyethylene bags immediately upon discovery. If possible, punctured and broken containers should also be double bagged in two six-mil polyethylene bags.

Bags or boxes of friable asbestos waste must be properly secured and transported within an enclosed vehicle or covered by a tarpaulin or net if transported in a vehicle which is not enclosed.

## Sample Shipping Document

The following is the minimum required information which must appear on a shipping document:

Shipping Document Information	When Required	Where in The Regulations
Date	Always	3.5(1)(b)
Name and address of consignor	Always	3.5(1)(a)
Description of goods in the following order		3.5(1)(c)
a. UN number	Always	3.5(1)(c)(i)
b. Shipping name	Always	3.5(1)(c)(ii)
c. Primary classification	Always	3.5(1)(c)(iii)
d. Subsidiary classifications	If Any	3.5(1)(c)(v)
e. Packing group	If Any	3.5(1)(c)(vi)
The quantity in the International System of Units (SI) <sup>1</sup>	Always	3.5(1)(d)
The number of containers <sup>2</sup>	For dangerous goods in small containers requiring safety labels	3.5(1)(e)
The words "24-Hour Number" followed by a telephone number where the consignor can be easily reached <sup>3</sup>	Always	3.5(2)
Consignor's Certification: "I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations." (Section 3.6.1)	Always	3.6.1

### Safety Marks

Safety marks are labels, placards, UN numbers, and package markings. They are described in Part 4 of the TDG Regulations. The consignor is responsible for displaying safety marks on all means of containment carrying dangerous goods [Section 4.4].

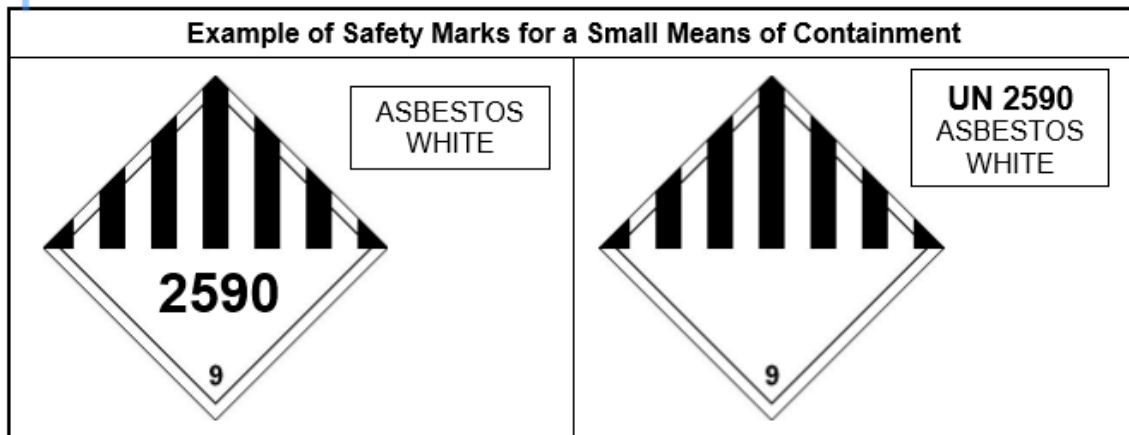
The carrier is responsible for making sure that the safety marks remain displayed during transport. The carrier is also responsible for removing or changing the safety marks if the requirements for dangerous goods safety marks change during transport [Section 4.5].

### Small Means of Containment

A small means of containment has a capacity of 450 L or less. A small container must display the dangerous goods label(s), the shipping name and the UN number of the product [Sections 4.10 to 4.12].

The label is 100 mm on each side. If the container is too small or it has an irregular shape, the label can be reduced in size up to a dimension of 30 mm on each side [Section 4.7(2)].

The UN number for a dangerous goods label can be placed next to the label as shown below [Section 4.8(1)(b)].



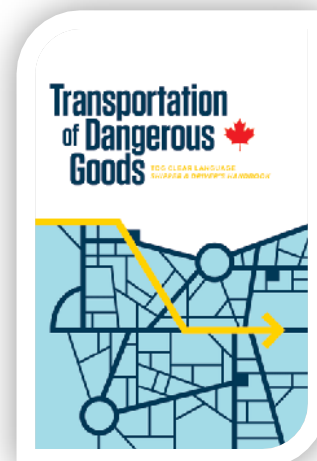
### Training

Unless there is an exemption under the TDG Regulations, anyone who handles, offers for transport or transports dangerous goods must have a valid Dangerous Goods Training Certificate or must be under the direct supervision of a trained person [Section 6.1]. A person is adequately trained if the person has sound knowledge of the topics listed in Section 6.2 of the TDG Regulations that relate directly to the person's duties.

The employer issues a training certificate when they have reasonable grounds to believe that an employee possesses adequate training. Self-employed people can issue training certificates for themselves. The employer must keep a record of the training that the employee has received and a copy of the training certificate [Section 6.6]. The training certificate must be immediately presented to an inspector who requests it [Section 6.8].

### Reporting Requirements

In case of an accidental release or an imminent accidental release of dangerous goods, the person who has possession of the dangerous goods must report immediately to the local police and the provincial authority at **1-800-272-9600**. In the case of asbestos, an immediate report is required when there is any release of 25 kg or more [Section 8.1]. For details of reporting requirements, consult Part 8 of the TDG Regulations or call the Coordination and Information Centre at **1-800-272-9600** and ask for the bulletin entitled, *Dangerous Goods Reporting Requirements*.





## Final Disposal

Every container referred to in the previous section must be free from punctures, tears, or leaks, and must be clearly labelled to indicate the nature of the contents and the presence of a carcinogenic hazard, with a warning that the dust should not be inhaled. The final disposal site of asbestos waste must be a sanitary landfill approved by the local Board of Health or an industrial landfill approved and designated as Class I or II by Alberta Environment and Parks.

### Disposal of Asbestos Waste Acceptable Industry Practices (February 2012)

This document provides acceptable industry practices of waste asbestos disposal, clarifies the regulatory requirements for asbestos waste management under the *Alberta Environmental Protection and Enhancement Act*.

In Alberta, asbestos waste is not considered to be a hazardous waste provided it is managed in accordance with the *Guidelines for the Disposal of Asbestos Wastes*. The *Alberta Waste Control Regulation* further deems asbestos waste non-hazardous when generated from specific sources or in small quantities specifically, household hazardous waste in the possession of the householder or while unsegregated in a municipal waste management system.

As described in the Guidelines, Section 4.3.1, asbestos waste being transported from the location at which it is generated:

- i. should be transported as directly as possible to the intended waste disposal site;
- ii. should not be transported with any other cargo in the same vehicle;
- iii. should not be mixed with other types of waste; and
- iv. should not be transported in a compaction type waste haulage vehicle. The external surfaces of every container and of every vehicle or vessel used for the transport of asbestos waste must be free from asbestos waste. Asbestos waste must be properly secured and transported within an enclosed vehicle or covered by a tarpaulin or net if transported in a vehicle which is not enclosed.

Additional recommendations for hauling friable asbestos waste are described in the *Guidelines*, Section 4.3.2.

### Friable Asbestos Waste

Where containers of asbestos waste are being unloaded, the unloading shall be carried out so that no loose asbestos waste or punctured, broken or leaking containers of asbestos waste are landfilled. Any asbestos waste that is in a container that is punctured, broken or leaking shall be double bagged, immediately on discovery, in two six-mil polyethylene bags. Asbestos waste may be deposited only at locations in a landfilling site that have been adapted for receiving asbestos waste or are otherwise suitable for that purpose. Asbestos waste may be deposited at a landfill site only while the depositing is

being supervised by the operator of the site or a person designated by him for the purpose, and the person supervising is not also operating machinery or the truck involved.

### Cover

Where asbestos waste is deposited, at least 25 centimetres of cover material, other than garbage, must be placed immediately over the waste in such a manner that direct contact with compaction equipment or other equipment operating on the site is avoided. The final cover should be at least 125 centimeters thick and may include garbage.

### Hygiene

The surfaces of vehicles and reusable containers which have been in direct contact with asbestos waste must be thoroughly cleaned prior to leaving the disposal site. Only the minimum amount of water necessary to wet the asbestos fibers should be used during cleaning. Any waste produced during vehicle or container cleaning should also be covered immediately.

Every person directly or indirectly involved in the transportation, handling or management of asbestos waste should take all precautions necessary to prevent asbestos fibers from becoming airborne.

### Asbestos Waste Code of Practice

The following information is taken from Code Of Practice on the Handling, Transportation and Disposal of Asbestos Waste

[http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/air/asbestos/files/CoPonAsbestosWaste2007\\_17022011A.pdf](http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/air/asbestos/files/CoPonAsbestosWaste2007_17022011A.pdf)

Landfill operators and managers are encouraged to consider the content and assess the value it may have for their site operations.

### Mixed Asbestos Wastes

The types of asbestos waste should normally be kept separate from each other, and from other waste. In some circumstances this can be difficult, for example where intact bonded asbestos is mixed with sawdust and friable materials. Unlike many other hazardous wastes, asbestos cannot be readily detoxified or rendered harmless by waste treatment processes.

Many of the waste handling and treatment operations used to manage construction and demolition waste will have the effect of breaking up asbestos waste and releasing fibres into the atmosphere, thereby endangering employees and the public. Therefore, asbestos waste should never be mixed with household or commercial wastes, nor delivered to incinerators, refuse collection points, transfer stations or public dumping areas.

The positive identification of asbestos fibres requires specialist laboratory techniques. Asbestos waste produced by industrial processes is readily identified from the raw materials used, but in the case of many construction and demolition operations (involving for instance the stripping of lagging or other forms of insulation) the waste may contain either asbestos or other fibrous materials. Even where

asbestos is known to be present, exposure to heat can change the characteristic blue-grey colour of crocidolite to a dirty, white colour, which may be confused with the less hazardous forms.

Waste which may contain asbestos should be treated as hazardous unless and until laboratory tests prove its absence. In the case of small amounts of waste, it is more practicable to dispose of it as if it were asbestos rather than to undertake laboratory testing to determine the actual constituents. For larger quantities samples of the waste should be taken and tested in the laboratory for asbestos. These samples should be taken before work begins in the case of demolition work and insulation stripping.

### Storing Asbestos Waste

If special arrangements must be made at the disposal site for large volumes of asbestos waste, then waste producers will need to make provisions for the temporary storage of the waste. All storage of asbestos waste should be carried out properly in a secure place isolated from other substances to prevent any possible release of asbestos fibres into the atmosphere and contamination of other substances. Bagged asbestos waste should not be stacked more than 3 bags high to avoid damage to the bottom bag. The storage area should be isolated from other working areas and bear warning panels to alert people of the presence of asbestos waste.

### Final Disposal

Certain operations may produce large quantities of asbestos waste within a short period of time, for instance when a power station or chemical plant is demolished. Waste arising greater than 250m<sup>3</sup> in volume should be considered a large quantity. In those circumstances the rate of waste production may exceed the ability of the disposal sites to handle and dispose of the waste and it would be necessary for a waste generator to inform the receiving disposal site at the planning stage of the operations. The waste generator should provide the disposal site with its work plan and the estimated waste volumes so that suitable disposal arrangements can be made. If there is no prior agreement between the waste producer and the accepting disposal site, the disposal of large volumes of asbestos waste should be restricted and more stringent conditions than usual may be imposed by the receiving site. Waste generators must be informed that disposal at a landfill site requires site preparation, and to allow for this, and the phasing of asbestos disposal with other operations on the site.

At the disposal site, the waste generator or collection contractor should ensure that the disposal operation is carried out in accordance with the instructions of the landfill site staff. Non-friable asbestos waste should normally be disposed of at the tipping face at the location as directed by the landfill operator while friable asbestos wastes should be disposed of into pre-excavated trenches. Asbestos waste should be placed into a trench by hand or mechanical crane as appropriate. Placement of waste should progress from one end of the trench to the other. Throwing, dropping bags, and stepping on bags or packages during unloading are strictly forbidden. A half metre clearance at the top of the trench for subsequent backfilling with soil should be allowed for. A trained person who is experienced on working with asbestos should be provided by the waste collector and should be assigned with the responsibility to supervise the disposal operation.

## Alberta Occupational Exposure Limits

Alberta's OHS legislation sets out employer and worker responsibilities at the work site. The 8-hour Occupational Exposure Limit (OEL) for all forms of asbestos is 0.1 fibres per cubic centimetre (f/cc).

### Employer Responsibilities

Employers must:

- Control the release of asbestos fibres to keep the concentration of fibres in the air as low as reasonably practicable;
- Ensure that workers at the work site are protected from exposure to asbestos and other hazards;
- Develop work procedures to minimize exposure to asbestos;
- Provide suitable personal protective equipment to workers;
- Train workers in the hazards of asbestos;
- Train workers in the employer's standard operating procedures; and
- Ensure that asbestos exposed workers are provided with a health assessment.

### Worker Responsibilities

Workers are responsible for taking reasonable care of themselves and others at the work site. Workers must:

- Become aware of the hazards associated with working with asbestos;
- Follow the employer's work procedures;
- Practice good personal hygiene;
- Wear the protective equipment required for the work and use the equipment properly; and
- Participate in training programs provided by the employer.

### Risk Classification Matrix

Material Type	Type of Load		
	Commercial	Residential	Skip Bin (1-800-JUNK)
Clean Concrete	Low	High	High
Bagged Friable	Low	High	High
Mixed C & D Waste	High	High	High

## Site-level Code of Practice

The Code of Practice should form part of the broader Operations Plan that should be present and implemented at the landfill site.

- 1 Identify where and when workers may be exposed to chemical.
- 2 Develop controls and work procedures to prevent exposure to the chemical.
- 3 Develop protocols to address emergency situations and releases.
- 4 Develop decontamination procedures.
- 5 Develop methods to handle and control waste.
- 6 Determine training requirements and training resources.
- 7 Identify protocols for follow-up and monitoring.
- 8 Identify who are the appropriate site contacts.

## Sample Site Level Code of Practice from the City of Calgary

### **Asbestos Disposal Code of Practice**

**November 11/2012**

#### ***Purpose***

This Code of Practice is intended to meet the requirements of the City's Landfill Approval issued by Alberta Environment and Sustainable Resource Development (ESRD) and consistently minimize airborne concentrations of asbestos fibre at The City of Calgary Shepard Landfill to a minimum level, well below the Occupational Exposure Limit set by the Province of Alberta Occupational Health and Safety.

#### ***Asbestos Disposal Area Design***

The designated cell for disposal of asbestos contaminated waste containing 1% or greater by weight will be isolated from day to day operational areas to minimize potential for airborne fibre exposure or surface contamination when unloading and covering asbestos contaminated waste. A device reliably indicating wind direction will be visible from the asbestos disposal cell.

Bunkers are to be prepared in advance of unloading to reduce scattering of loads and minimize the amount of soil necessary to provide a minimum of one foot (300mm) of cover as per ESRD Approval requirements

Granular material such as sand or street sweepings will be stockpiled near the designated asbestos bunker to allow equipment operators to efficiently sprinkle a minimum, consistent 4 inch (100 mm) covering of this finer material over the load before covering with heavier soil to a depth of 1 foot (300mm).

#### ***Abatement Contractor Responsibilities***

Materials containing asbestos greater than 1% by weight are to be wetted and then sealed in double 6 mil poly bags, or double wrapped and sealed in 6 mil poly sheeting.

Asbestos abatement contractors and those contracted to haul their wastes will be provided an information sheet detailing the Landfill's requirements for acceptable loads. Written notification of abatement contractors or meetings to answer questions and reinforce the need for consistent compliance may occur.

W&RS Disposal and Processing reserves the right to:

- refuse individual loads at any time,
- levy surcharges on loads requiring additional precautions to handle safely, and
- refuse loads from repeat offenders identified by the Landfill's Environmental Control Technologist

***Arrival at Weigh Scale***

Waste materials containing asbestos >1% by weight are accepted only by appointment with the Environmental Control Technologist. Disposal occurs only at the Shepard landfill Tuesday to Friday, prior to 11:30 AM.

The Environmental Control Technologist is notified by weigh scale personnel of the arrival of waste materials containing asbestos >1% by weight. Each load undergoes an initial check prior to acceptance that includes review of documentation. Loads clearly not meeting W&RS, ESRD Approval or OH&S requirements are not accepted by the Technologist for disposal at the landfill.

If the load is accepted, communications between the Environmental Control Technologist and the transport vehicle will be maintained at all times while on site through exchanging cell phone numbers or issuing two way radios to asbestos waste haulers at the weigh scale.

***Securing of Asbestos Disposal Cell***

Personnel and public not involved in receiving, unloading, wetting or covering at the asbestos disposal cell will remain:

- 30 meters away from the disposal area while unloading, and
- 30 meters away from the disposal area for 10 minutes after unloading.

***Loads Containing Asbestos Greater than 1% by Weight***

Loads containing asbestos greater than 1% by weight accepted for disposal at the landfill are accompanied to the asbestos disposal cell assigned by the Environmental Control Technologist. The Technologist instructs and monitors that:

- the load is dumped by slowly raising the hoist to minimize breaking open bags and wrappings, and
- spreading of the load is minimized by fully raising the hoist before slowly moving ahead.
- waste unloaded by hand is placed with sufficient care to prevent breaking open bags and wrappings.

The Environmental Control Technologists will remain upwind in their vehicle while monitoring dumping and covering operations, keeping windows rolled up and doors closed. If the vehicle has a HEPA cabin air filter, the heater fan should be turned on. If no HEPA cabin filter, the heater fan will be turned off during unloading operations.

In rare cases such as demolition after a fire, asbestos waste can only be removed safely by mechanical means and may be wetted but is not bagged or wrapped. In this case, the asbestos spill response plan is activated and the material is immediately wetted and covered.

### ***Metal Shredding "Fluff"***

From an ESRD standpoint, waste materials containing asbestos less than 1% by weight are not required to be disposed of in the designated asbestos cell. There is no ESRD requirement for waste materials containing asbestos less than 1% by weight to be bagged or wrapped.

Metal recyclers dispose of automotive shredding residue (ASR or "fluff") comprised of lightweight materials sorted mechanically during the metal shredding process. Metal recyclers whose fluff is intended to be disposed of at the tipping face must consistently maintain a comprehensive internal program to identify and reject known asbestos containing material. As well, metal shredding fluff must be shown by the recycler's periodic sampling results obtained from an accredited laboratory to contain asbestos less than 1% by weight. This program and written sampling results will be forwarded to W&RS and reviewed before materials will be accepted for disposal at the tipping face.

**(Note:** As the "fluff" pile at metal recycler's sites is not a homogenous mixture, a small percentage of the total number of samples can be expected to show low asbestos content).

From an OH&S health and safety standpoint, a critical condition of accepting fluff containing less than 1% asbestos by weight for disposal at the tipping face is that the load be delivered wet. The wet load is to be disturbed as little as possible and covered immediately with a minimum of one foot of waste material.

Known dry loads are to be dumped in the asbestos disposal cell or other isolated location authorized by the Superintendent and immediately wetted down before covering as a priority.

**Note:** Sampling for ESRD disposal purposes to classify fluff as containing greater or less than 1% by weight is not an indicator of potential for release and inhalation of airborne asbestos fibre. Personal air monitoring is the only reliable indicator of airborne fibre exposure potential from an OH&S standpoint.

If concerns arise about concentrations of asbestos in "fluff", or the effectiveness of the control strategy above, the Safety Advisor and Occupational Hygienist are to be immediately contacted.

### ***Asbestos Spill Response Plan***

As the exact nature of loads cannot always be ascertained during inspection at the weigh scale and damage to bagged/wrapped materials can occur during unloading, it is important to have an immediate response plan to prevent fibre from becoming airborne. Circumstances where asbestos fibre can become airborne following unloading include:

- a significant number of broken bags/wrappers or improperly sealed bags/wrappers, or
- unseen materials required to be bagged or wrapped that are loose, or
- dry loads of "fluff" received from metal recyclers, wherever dumped or
- unsealed materials where asbestos waste can only be safely removed mechanically

Immediate wetting prevents fibres from becoming airborne and the materials must remain wet until the load can be covered with soil. Water (or another acceptable liquid) shall immediately be used to wet the load before covering at the first opportunity.

The preferred method is using the Landfill's water truck as indicated below:

- The water truck operator flushes the load using the front jets operated from inside the truck if the truck can be positioned within 30 feet (10 meters) of the load, and preferably upwind. The operator will remain in the truck with windows rolled up and doors closed while approaching the load and flushing. The heater fan is turned off if cabin air is not HEPA filtered or turned on if the cabin air is HEPA filtered.

Depending on truck access to the load, a second option is:

- The water truck operator may hose down the load while standing upwind and as far back as the water stream will allow. Doors and windows will be closed and heater fan set as noted above. The operator will be wearing a half face, dual cartridge respirator with HEPA filters, disposable gloves and disposable coveralls with hood while outside the cab. Before re-entering the truck cab, the coveralls, gloves and HEPA respirator filters will be removed and sealed in a plastic bag and the bag left with the other asbestos contaminated materials.

### ***Covering Loads at the Asbestos Cell***

Street sweepings, sand or other granular material stockpiled at the asbestos disposal bunker will be sprinkled to a minimum depth of 4 inches (100 mm) prior to placing heavier soils over the load to a total minimum depth of one foot (300mm). This granular material blanket is intended to prevent release of fibre into the air when placing heavier soils.

Depending on the size of the load to be covered and the reach of the equipment, it may be necessary to repeat sprinkling of granular material and dumping heavier soil overtop it a number of times to ensure all asbestos containing material has been fully covered to a depth of one foot before driving atop it to reach the next uncovered part of the load.

Scattered materials must be covered in place. Equipment operators must visually check that the load is fully covered by soil before leaving the asbestos disposal area.

### ***Equipment Maintenance and Cleanup***

Earthmoving equipment used to cover asbestos contaminated materials shall have an air conditioned cab and only HEPA filters shall be used to filter cabin air. The requirement for air conditioning and HEPA filters are to be specified in the contract documents. Air conditioning systems are to be maintained by the equipment owner in a manner enabling operators to keep cab doors and windows fully shut at all times while operating at the asbestos disposal site.

In addition, the Landfill's equipment contractor shall ensure all earthmoving equipment used for asbestos covering operations receive a thorough, regular wet cleanup of the inside of the cab (including the floor) of a sufficient frequency to prevent accumulations of asbestos fibre inside the cab. The contractor will determine whether employees or abatement contractors perform this cleanup at the contractor's time and expense. Records of cleaning are to be maintained onsite, whether on the operator's daily vehicle inspection checklist or another document.

The Landfill's Environmental Control Technologists and Water Truck Operator shall do a thorough wet cleanup of the cab of their truck on a monthly basis as a minimum to prevent accumulations of asbestos fibre inside the cab. Cleaning is to be recorded on the driver's daily vehicle inspection checklist. An abatement contractor or special precautions are not required if the cabs are cleaned regularly.

Disposal Foremen will monitor that earthmoving equipment, water truck and Technologist's truck cabs are maintained clean on an ongoing basis and check documentation to confirm.

### ***Reporting Problems and Concerns***

Contracted equipment and Landfill personnel are encouraged to immediately bring forward any problems with consistently maintaining the above procedures or all concerns with the effectiveness of the control strategies to the Landfill Foremen. Reporting problems and concerns immediately will continue to be encouraged as critical to maintaining consistent compliance with AENV and OH&S requirements.

### ***Air Quality Monitoring***

The City's occupational hygienist will conduct an exposure assessment consisting of swab sampling of the inside of the heavy equipment cab (including heating/ventilation system), full shift monitoring of the contracted equipment operators, and full shift monitoring of W&RS employees assigned to the tipping face that is appropriate to verify air quality remains acceptable under OH&S legislation:

- on an annual basis to confirm the current procedures remain effective, and
- whenever significant changes to the dumping or unloading process occurs, and
- whenever requested by the Landfill Superintendent or Safety Advisor.

The City's occupational hygienist will also swab sample inside the cab of the Environmental Technician's trucks and the water truck on an annual basis to confirm accumulations of fibre do not develop. An abatement contractor will be used to clean any highly contaminated cabs.

The Landfill will absorb the cost of all lab analysis for swab sampling and air quality monitoring, along with cleanup of City vehicles.

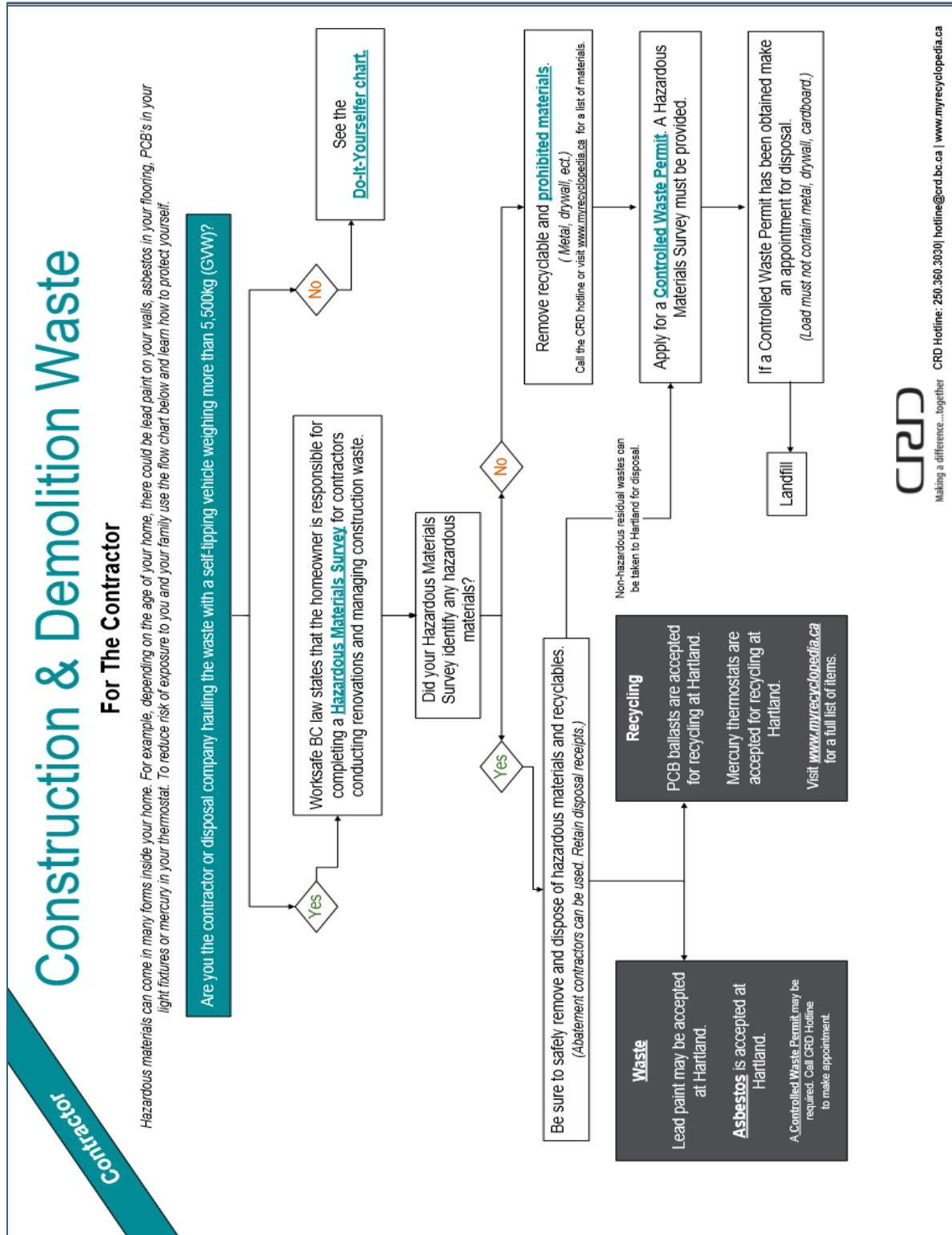
***Recordkeeping***

Written records of air quality monitoring and swab sampling will be maintained by the hygienist and the landfill until such time as an electronic database accessible to both can be set up.

***Reference Documents***

SOP DPS-2080 – Managing Asbestos Disposal

## Generator Decision Making Tree



<https://www.crd.bc.ca/docs/default-source/recycling-waste-pdf/construct-demo-chart-doityourselfer.pdf?sfvrsn=8>

## Sample Disposal Request



Making a difference...together

## Hartland Landfill Out-of-Region Asbestos Disposal Request Form

## CONTACT INFORMATION

Waste Generator  Homeowner  Contractor

## Asbestos Removal Site

Company:

Address:

City:  Province:  Postal Code:

Phone (primary):  Extension:  Phone (secondary):

Email:  BCG#:

Contact Person:

Hauling Company:

Address:

City:  Province:  Postal Code:

Phone (primary):  Extension:  Phone (secondary):

Email:  BCG#:  LTW:

Contact Person:

Abatement Company:

Address:

City:  Province:  Postal Code:

Phone (primary):  Extension:  Phone (secondary):

Email:  BCG# (if applicable):

Contact Person:



## ASBESTOS WASTE

Type of Packaging:  6mil Bag  Bladder  Sheet  Other:

Weight (Kg):  No. of Loads:  Waste Description:

Disposal Date Requested:  Time:

### For contractors hauling asbestos waste, please ensure that:

- All asbestos containing materials is double bagged and labelled in UN rated 6 mil poly asbestos bags and gooseneck sealed with duct tape;
- The hauler has a BC generator (BCG) number;
  - Load(s) that exceed 1,000kg within a 30 day period must have a BCG# prior to scheduling an appointment;
- The hauler has a License to Transport (LT);
- A waste manifest is provided to the scales attendants (for loads greater than 5Kg); and
- The proper placarding is present on vehicle.

### For the homeowner hauling asbestos waste (in their own vehicle), please be aware that:

- All asbestos containing materials must be double bagged and labelled in UN rated 6 mil poly asbestos bags and gooseneck sealed with duct tape;
- No waste manifest is required as long as the homeowner is hauling the waste in their own vehicle; and
- Load(s) that exceed 1,000kg within a 30 day period must have a BCG# prior to scheduling an appointment.

\* Attach lab analysis of materials.

\* Asbestos loads are only accepted with appointment from Monday to Friday (9am to 2pm).

\* All loads of Asbestos entering the Hartland Landfill must meet all Federal, Provincial, and Regional regulations or acts related to the disposal and transportation of Asbestos.

\*\*Asbestos pipe does not require a manifest or BCG#

## APPLICANT SIGNING AUTHORITY

Name:   Resident  Hauling Company  Abatement Company

Title:  \_\_\_\_\_  
Signature (not required with online submissions)

Date:

I/We hereby declare that all the information provided herein is to the best of my/our knowledge, true, complete and correct and understand that it will be used by the Capital Regional District to determine approval for the disposal of out-of-region waste asbestos.

### Questions? Contact:

Hartland Landfill  
1 Hartland Avenue  
Victoria, BC V9E 1L9

T: 250.360.3410  
F: 250.727.3328  
Email: HartlandReception@crd.bc.ca

### For Office Use Only

Manager Approval:

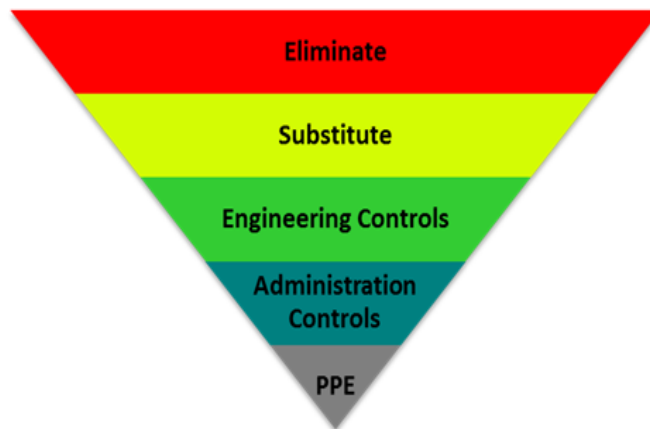
Date:

Disclosure: Personal information on this form is collected under the authority of the local Government Act and is subject to the Freedom of Information and Protection of Privacy Act. The personal information will be used for programs associated with the Hartland Asbestos Disposal Program. Inquiries about the collection or use of information in this form can be directed to Chris Posters, Manager of Solid Waste Operations 250-360-3410.

### Risk Classification and Controls Matrix

	Eliminate	Substitute	Engineered Control	Administrative Control	Personal Protective Equipment
<b>Waste Generator</b>	To remove the risk of coming in contact with friable asbestos, demolition companies and home owners must contract an abatement company to inspect and test materials they will be removing.	Not an option for demolition contractors or home owners.			
<b>Landfill Operator</b>	Landfills can choose to not accept asbestos waste.	Landfills can keep a list of sites that take asbestos waste and redirect generators.	Asbestos isolated from non-essential personnel.  Asbestos not accepted during high wind conditions.	Site Code of Practice  SOPs	<ul style="list-style-type: none"> <li>» NIOSH-approved Respirator</li> <li>» Tyvek coveralls - tight fitting around head, wrists, ankles</li> <li>» Hard Hat</li> <li>» Nitrile Gloves</li> <li>» Steel-toed rubber boots</li> </ul>

### Hierarchy of Controls



## Resources

Alberta Asbestos Abatement Manual. (2012). <http://work.alberta.ca/documents/asbestos-abatement-manual.pdf>

Alberta Government. (1989). Alberta Guidelines for Disposal of Asbestos Waste. <http://aep.alberta.ca/air/legislation/documents/GuidelineDisposalAsbestosWaste-1989.pdf>

Alberta Government. (2017). Asbestos at the Work Site. <https://work.alberta.ca/documents/OHS-bulletin-CH019.pdf>

Alberta Government. (2015). Activities Designation Regulation. [http://www.qp.alberta.ca/documents/regs/2003\\_276.pdf](http://www.qp.alberta.ca/documents/regs/2003_276.pdf)

Alberta method of collection and analysis for worker exposure is NIOSH 7400. NIOSH method <http://www.cdc.gov/niosh/docs/2003-154/pdfs/7400.pdf>

Alberta Government. Home Renovations. [http://www.servicealberta.gov.ab.ca/pdf/tipsheets/Home\\_Renovations.pdf](http://www.servicealberta.gov.ab.ca/pdf/tipsheets/Home_Renovations.pdf)

Alberta Government. (November 2012). Transportation of Asbestos as a Waste. A technical publication from the Coordination and Information Centre. Dangerous Goods, Vehicle & Rail Safety Branch.

Alberta Government. (February 2012) Disposal of Asbestos Waste. Acceptable industry practice. <http://aep.alberta.ca/waste/waste-management/documents/DisposalAsbestosWaste-Feb2012.pdf>

Alberta Occupational Health and Safety. (February, 1989) Issues and Legislative Gap Analysis Pertaining to the Worker and Public Exposure to Asbestos.

Asbestos Containing Materials  
<http://warehouse.pws.gov.nt.ca/pdf/publications/Asbestos%20Removal%20and%20Disposal%20Guidelines%202010.pdf> Pages 50 – 52

Code of Practice on The Handling, Transportation and Disposal of Asbestos Waste  
[http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/air/asbestos/files/CoPonAsbestosWaste2007\\_17022011A.pdf](http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/air/asbestos/files/CoPonAsbestosWaste2007_17022011A.pdf)

Department of Environment and Conservation. Australia. (2012) Guidelines for Managing Asbestos at Construction and Demolition Waste Recycling Facilities.  
<https://www.der.wa.gov.au/images/documents/our-services/approvals-and-licences/final-guidelines-asbestos-in-cd-recycling--version-1.pdf>

Environmental Law for Landfills Go to: Alberta Occupational Health  
[http://elc.ab.ca/Content\\_Files/Files/faq11.pdf](http://elc.ab.ca/Content_Files/Files/faq11.pdf)

EPA Asbestos Monitoring Protocol. <http://archive.epa.gov/region9/toxic/web/pdf/epa-ertasbestos-sampling-sop-2015.pdf>

Information for Homeowners. Examples: <https://www.crd.bc.ca/docs/default-source/recycling-waste-pdf/construct-demo-chart-doityourselfer.pdf?sfvrsn=8>

NIOSH Chemical Index. <http://www.cdc.gov/niosh/npg/>

Northwest Territories Public Works and Services. (February 2010). General Guidelines Asbestos Removal and Disposal.

<http://warehouse.pws.gov.nt.ca/pdf/publications/Asbestos%20Removal%20and%20Disposal%20Guidelines%202010.pdf>

Nova Scotia Department of Environment (December 6, 1988). *The Dangerous Goods and Hazardous Waste Management Act-Respecting Asbestos Wastes.*

Ontario Ministry of the Environment. (1988) *Regulation 309-General Waste Management.* Reg. 460/8  
Province of Alberta- Occupational Health and Safety Act *Asbestos Regulation 7/82*

Province of Alberta Occupational Health and Safety Act - *Chemical Hazardous Regulation 242/83*

Province of Alberta Occupational Health and Safety Act - *General Safety Regulation 348/84*

Province of Alberta Public Health Act - *Waste Management Regulation 250/85.*

Visual examples: <http://www.hse.gov.uk/asbestos/gallery.htm>

Where Asbestos hides – residential, and industrial examples:

<http://www.hse.gov.uk/asbestos/building.htm>