



**REPORT**

# ASBESTOS MANAGEMENT PLAN

*Neptune Bulk Terminals, North Vancouver, BC*

Revision: 1

Prepared for:

**Neptune Bulk Terminals (Canada) Ltd.**

1001 Low Level Road,  
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**Envirochem Project No.: 22166**

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## 1.0 INTRODUCTION

### 1.1 Background

Asbestos is a designated human carcinogen by the International Agency for Research on Cancer (IARC) and the American Conference for Governmental Industrial Hygienists (ACGIH). Under section 5.57(1) of the BC Occupational Health and Safety Regulation, WorkSafeBC requires an Asbestos Management Plan (AMP) to be in place when asbestos-containing materials (ACM) are present in a workplace.

This AMP defines how asbestos is to be handled at Neptune Bulk Terminals (NBT) located at 1001 Low Level Road, North Vancouver, BC (the Site). Asbestos is present at the Site, and this plan describes steps and procedures required to be taken to prevent occupational exposure to asbestos.

### 1.2 Asbestos

Asbestos is a generic term describing several naturally occurring fibrous mineral silicates that have been used in a wide range of products due to their insulating, acoustical, fire protection and chemical resistant properties. Three types of asbestos that have been used commercially are the following:

- Chrysotile (white asbestos): Most common and is found in over 95% of asbestos-containing products.
- Amosite (brown asbestos): Has been used in spray coatings, heat insulation products, and asbestos cement products.
- Crocidolite (blue asbestos): Was commonly used before 1973 in spray coatings on structural steelwork for fire protection, and for heat and noise insulation.

Other types of asbestos include tremolite, actinolite, and anthophyllite.

Asbestos had been used in construction building materials between the 1930s and the early 1990's due to its characteristics of strength, heat resistance and chemical resistance. Many buildings constructed during that time (and some since) may contain some form of ACMs such as:

- Sprayed fireproofing on structural members
- Thermal insulation on heaters, boilers, pipes, fittings and other mechanical equipment
- Decorative or acoustic plasters or finishes on ceilings and walls
- Asbestos cement products, including roofing material and acoustic panels
- Electric insulation, laboratory table-tops, fume hoods, piping
- Ceiling Tiles
- Vinyl floor tiles and sheet flooring

Asbestos fibres are extremely fine and can remain suspended in the air for an extended period. Because they are so fine, that if inhaled the fibres can become lodged in lung tissues which can result in severe health problems. Exposure to asbestos fibres may cause serious chronic health problems such as asbestosis, lung cancer, mesothelioma, and pleural thickening. As such, proper control measures must be

implemented to prevent the disturbance of ACMs and to prevent potential exposure to airborne asbestos fibres.

The release of asbestos fibres from ACMs is primarily a result of activities that causes their disturbance. To prevent the exposure of individuals to asbestos fibres, proper precautions and safe work procedures must be implemented whenever ANY work is conducted on or close to ACMs. Inspection and assessment of the ACMs are to be conducted at least annually so and changes to ACM condition, or if is additional ACMs are discovered, prompt actions can be taken.

### 1.3 Objective

This AMP establishes a comprehensive system to actively manage and stringently control exposure to ACMs at the Site, and all activities, which may disturb such materials, including maintenance, alteration, demolition, and repair operations. The objectives of this plan are as follows:

- To provide procedures and accepted work practices in compliance with the BC Occupational Health and Safety Regulation (BC Reg. 296/97 as amended);
- To exercise due diligence in protecting employees from the potential health risks associated with hazardous exposure to airborne asbestos fibres;
- To provide a safe and healthy work environment for contractors, visitors, tenants, and the public in accordance with this AMP;
- To ensure absolute compliance with this plan by all employees and contracted personnel;
- Ensure ACMs be removed or encapsulated prior to any renovation and/or demolition activity, which may result in their disturbance;
- Ensure ACMs which have been damaged to the extent that repair measures are not expected to effectively maintain the material in good condition are to be removed in accordance with WorkSafeBC removal procedures.

### 1.4 Control Measures

Asbestos will be controlled using the following hierarchy:

**Substitution:** Replacement of ACMs with non-ACM products.

**Prohibition:** ACMs will not be brought to Site unless substitution is not technically feasible and approved by appropriate parties.

**Containment:** ACMs that are in good condition and where there is minimal risk of damage may be left in place undisturbed. Encapsulation or enclosure are effective means of containment.

**Removal:** ACMs are removed and disposed of in accordance with appropriate regulatory requirements.

## 1.5 Plan Elements

The basic elements of the AMP are:

- A written inventory identifying the locations of all suspected or confirmed ACMs;
- Regular inspection of all ACMs to evaluate their condition and the need for remedial action;
- Development of risk assessment guidelines to assist in evaluating the potential for exposure to ACMs;
- Maintenance of ACMs in good condition;
- Prompt abatement or removal of damaged or deteriorating ACMs;
- Control of access to areas containing friable ACMs;
- Timely training and education of all workers or contractors who may disturb ACMs, and all supervisors and project managers who contract or oversee all work that may disturb such materials;
- Classification of all asbestos-related work as low, moderate or high risk, according to WorkSafeBC definitions (see Section 1.6 below);
- Provision of appropriate safe work procedures, including emergency procedures;
- Maintenance of records of all asbestos-related work;
- Control and monitoring of external contractors performing work, which may disturb ACMs;
- Provision for auditing the implementation and effectiveness of the plan;
- Notification about the asbestos inventory, the AMP, and any asbestos-related work taking place in building and other persons who work with or around ACMs.

## 1.6 Definitions

**Asbestos:** Asbestos is a generic term describing a number of naturally occurring fibrous, hydrated mineral silicates that differ in chemical composition and are suitable for use as non-combustible, non-conducting and chemically resistant materials. Different types of asbestos which may be found in buildings are chrysotile, amosite, tremolite, actinolite or anthophyllite.

**Asbestos Abatement:** Corrective action taken to minimize or eliminate the hazards associated with ACMs, including repair, encapsulation, enclosure or removal.

**Asbestos-Containing Material (ACM):** Section 6.1 of the BC Occupational Health and Safety Regulation defines ACM as:

1. a manufactured article or other material, other than vermiculite insulation, that would be determined to contain at least 0.5% asbestos if tested in accordance with one of the following methods:
  - (i) Asbestos, Chrysotile by XRD, Method 9000 (Issue 2, dated August 15, 1994) in the NIOSH Manual of Analytical Methods, published by the United States National Institute for Occupational Safety and Health, Centre for Disease Control
  - (ii) Asbestos (bulk) by PLM, Method 9002 (Issue 2, dated August 15, 1994) in the NIOSH Manual of Analytical Methods, published by the United States National Institute for Occupational Safety and Health, Centre for Disease Control

(iii) Test Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116, dated July 1993) published by the United States Environmental Protection Agency

2. vermiculite insulation that would be determined to contain any asbestos if tested in accordance with the Research Method for Sampling and Analysis of Fibrous Amphibole in Vermiculite Attic Insulation (EPA/600/R-04/004, dated January 2004) published by the United States Environmental Protection Agency

**Asbestos Inventory:** The asbestos inventory is a record of the location of all ACMs (or those suspected of containing asbestos) present within a building and whether these materials are friable. In the case of sprayed-on material, if the material is known to be an ACM, the record should state the type of asbestos, if known, or in any other case, a statement that the material will be treated as though it contained a type of asbestos other than chrysotile.

**Friable:** ACMs may be classified as friable or non-friable. A friable material is defined as a material that, when dry, can be crumbled, pulverized or powdered by hand pressure.

Friable materials present a greater hazard of releasing asbestos fibers than non-friable materials. Common friable asbestos-containing building materials include sprayed fibrous fireproofing, thermal pipe insulation, and decorative or acoustic texture plasters. Common non-friable asbestos-containing building materials include asbestos cement boards, ceiling tiles and vinyl floor tiles.

**Low risk work activity:** A work activity that involves working with or in proximity to ACM if, at the time the work activity is being carried out, both of the following apply:

1. the ACM is not being:
  - (i) cut, sanded, drilled, broken, ground down or otherwise fragmented, or
  - (ii) disturbed such that the ACM may release airborne asbestos fiber.
2. it is not necessary to use personal protective equipment or engineering controls in respect of that activity to prevent exposure of a worker to airborne asbestos fiber

**Moderate risk work activity:** A work activity, other than a high risk work activity, that involves working with or in proximity to ACM if, at the time the work activity is being carried out, one or both of the following apply:

1. the ACM is being:
  - (i) cut, sanded, drilled, broken, ground down or otherwise fragmented, or
  - (ii) disturbed such that the ACM may release airborne asbestos fiber
2. it is necessary to use personal protective equipment or engineering controls, or both, in respect of that activity to prevent exposure of a worker to airborne asbestos fiber

**High-risk work activity:** A work activity that involves working with or in proximity to ACM if a high level of control is necessary in respect of that activity to prevent exposure of a worker to airborne asbestos fiber.

**Qualified person:** A person who:

1. has knowledge of the management and control of asbestos hazards through education and training, and
2. has experience in the management and control of asbestos hazards.

## 2.0 ROLES AND RESPONSIBILITIES

### 2.1 NBT Responsibilities

NBT has the following responsibilities within the AMP:

1. To be responsible for the development, maintenance, quality, and effectiveness of the AMP, and to ensure that it meets the requirements of the BC Occupational Health and Safety Regulation and industry standards.
2. To provide technical advice and recommendations regarding asbestos identification, hazard evaluation, and control measures related to asbestos.
3. To provide ongoing asbestos training and education programs as required.
4. To ensure that all workers, contractors, and persons who may conduct asbestos work have respiratory protection, training, and fit testing.
5. To maintain a list of employees who have participated in the asbestos training and education programs.
6. To audit the implementation of the AMP on an ongoing basis.
7. To review the AMP once every year.

### 2.2 External Contractor Responsibilities

External contractors working near ACMs where disturbance or removal is not part of the scope of work, but the possibility of disturbance is possible have the following responsibilities:

1. To provide written acknowledgement that they have read and will comply with the requirements of the AMP.
2. To ensure that all employees under their control are informed about the location of ACMs that may be disturbed.
3. To work in a manner to avoid the disturbance of ACMs, other than those asbestos work activities they have been contracted to carry out. (See Section 2.3 below)
4. To ensure that all employees under their direction are properly trained in asbestos hazards and control procedures prior to conducting any work that may disturb asbestos, and to provide documentation of this to the department contracting the work.
5. To ensure that employees immediately stop all work and notify the site owner in the event that known ACMs are disturbed or previously unidentified ACMs are discovered in the course of work.

### 2.3 Asbestos or Demolition Contractor Responsibilities

Asbestos or Demolition Contractors working on the Site where the removal of ACMs is the part of the scope of work must complete, or ensure are complete, the following before starting work:



### 2.3.1 Hazard Assessment

Section 20.112 of the BC Occupational Health and Safety Regulation requires a hazard assessment be conducted prior to “demolition or salvage of machinery, equipment, a building or a structure, or the renovation of a building or structure.” The hazard assessment must be completed by a qualified person and identify the hazardous materials, if any.

### 2.3.2 Notice of Project

If any construction/deconstruction activity involves the disturbance of asbestos, “the owner or prime contractor must file a Notice of Project (NOP) with WorkSafeBC, in writing or by fax, at least 24 hours before starting the project” (*Safe Work Practices for Handling Asbestos* (WorkSafeBC, 2020)).

### 2.3.3 Risk Assessment

From the WorkSafeBC *Safe Work Practices for Handling Asbestos* (2020) “A risk assessment must be conducted by a qualified person prior to the disturbance, repair, or removal of ACMs. The purpose of the risk assessment is to gauge the location and condition of the material prior to the work, as well as any other potential hazards that might affect the workers.” This includes disturbance or removal of asbestos as the result of “any demolition, alteration, or repair of machinery, equipment or structures” (BC OHS Reg. Sec. 6.6(2)).

The content of the risk assessment will be in accordance with Section 6.6 of the BC Occupational Health and Safety Regulation.

### 2.3.4 Exposure Control Plan

Workers and/or contractors conducting work onsite that may be involved in the active or anticipated disturbance of friable asbestos of ACMs or generation of dust from non-friable ACMs must have an exposure control plan (ECP) in place.

An exposure control plan details the procedures and controls required to complete the work in a manner to minimize or eliminate the risk to workers’ exposure to asbestos. The exposure control plan must be completed by a qualified person and contain all these elements (*Safe Work Practices for Handling Asbestos* (WorkSafeBC, 2020)):

- Statement of purpose
- Responsibilities of employers, supervisors, and workers
- Risk identification and assessment
- Risk controls
- Written safe work procedures
- Worker education and training
- Written records
- Hygiene facilities and decontamination procedures
- Health monitoring

## 2.4 Prime Contractor Responsibilities

Prime Contractors have additional responsibilities when work involves asbestos-containing materials. Where there are two or more contractors involved on a project, “the prime contractor must coordinate the work activities of subcontractors on the worksite if those work activities may affect workers of more than one company” (*Safe Work Practices for Handling Asbestos* (WorkSafeBC, 2020)). Additionally, “the prime contractor must ensure the following:

- There is a written agreement between the prime contractor or owner and the other contractors that clearly establishes the responsibilities for the health and safety of workers, instruction and training of workers, supervision of work on the project, and any necessary air sampling and testing.
- The project is adequately planned, and all contractors know and understand their responsibilities.
- Each contractor complies with the requirements of the BC Occupational Health and Safety Regulation as they apply to the project.
- The work of contractors is carried out in such a way that it does not cause undue risk of injury or occupational disease to workers who are not involved in the project but are working nearby or are affected by the project.”

## 3.0 INVENTORY

An inventory of known asbestos-containing materials was compiled and included in **Appendix A**. Table 1 below summarizes known ACMs found at the Site.

**Table 1: Asbestos Inventory**

Material Location	Material Description	Material Condition	Testing Status	Date of Testing	Results (%)	Assessed Risk
Old Stores Building – Upper Floor	Drywall Joint Compound	Mostly good (concealed), with some <b>exposed</b> drywall panels/drywall joint compound located in the east storage area adjacent to the east entrance.	Test Complete	June 6, 2022	Chrysotile 0.5-3%	Low Risk

In addition to identifying the location of asbestos-containing materials, the inventory also includes the current risk assessment of each known asbestos-containing material. That risk assessment includes condition, friability, accessibility, and likelihood of damage. The procedure for assessing risk of ACM is included in **Appendix B**. All known asbestos-containing materials in the asbestos inventory will be inspected annually, with identified high risk materials inspected quarterly, following the procedure in **Appendix B**. A current inventory will be kept up-to-date electronically and accessible onsite.

## 4.0 LABELLING

To indicate the presence of ACMs in areas that may require special precautions prior to working (such as flooring, drywall joint compound, boiler insulation and elbows where asbestos materials are present), labels and/or signs will be installed and maintained. These labels are intended to serve as a safety reminder for workers in those areas where ACMs are found. Where signage is not in place, or if in doubt of the presence of asbestos in a specific area, employees or contractor must contact the owner to review the AMP.

## 5.0 ASBESTOS SAFE WORK PROCEDURES

Asbestos work is divided into one of three types:

- Low Risk
- Moderate Risk
- High Risk

The following safe work procedures will be used by NBT for the management of asbestos onsite:

1. Asbestos Inventory Risk Assessment
2. Emergency Response – Unplanned Discovery

The following safe work procedures have been developed for reference or use by asbestos abatement contractors working with asbestos onsite. However, it is expected contractors will have their own procedures and have been included to demonstrate the minimum requirements.

1. Bulk Sample Collection
2. Waste Asbestos Handling and Disposal
3. Emergency Response – Emergency Decontamination
4. Emergency Removal of Injured Asbestos Worker

Safe Work Procedures are included in **Appendices B to G**.

## 6.0 TRAINING

### 6.1 Employees

Any employees working in close vicinity of the ACMs, must have asbestos awareness training. Asbestos awareness training will include but not be limited to:

- The properties of asbestos and its effects on human health;
- Types, uses and likely occurrence of asbestos in the workplace;
- General emergency procedures when asbestos is discovered or disturbed;
- Activities resulting in potential exposure to asbestos;
- Regulatory overview.

## 6.2 Contractors

For contractors working on asbestos-containing equipment and materials, where there is risk of disturbance of asbestos or removal of asbestos, the contractor must ensure that every that a worker who is at risk of exposure to asbestos is adequately instructed and trained in:

- the hazards of asbestos,
- the means of identifying asbestos-containing material at the worksite,
- the work procedures to be followed,
- the correct use of the required personal protective equipment, and operation of the required engineering controls, and
- the purpose and significance of any required health monitoring.

## 7.0 PLAN REVIEW

NBT Health and Safety will review the contents of this AMP annually or in the event new asbestos-containing materials are identified.

## 8.0 PLAN CERTIFICATION

This AMP was prepared in accordance with, and meets the requirements of, the BC Occupational Health and Safety Regulation.

Yours truly,

**Envirochem Services Inc.**

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# APPENDIX A

## Asbestos Inventory

# Asbestos Inventory

Process Area	Physical Location	Asbestos Type	Equipment Type	Material	Asbestos Present	Condition	Friability	Accessibility	Likelihood of Damage	Frequency Of Access	Removed	SeverityScoreTotal	Date Stamp
Old Stores Building	Upper Floor - Storage Areas	White (Chrysotile)	Drywall	Drywall Joint Compound	Yes	Fair	High	Low	Low	Low	No	11	2022-06-06

# APPENDIX B

## Inventory Risk Assessment



## 1.0 PURPOSE

As required under Section 6.6 of the BC Occupational Health and Safety Regulation, a risk assessment will be performed on the inventory of all ACMs identified at NBT. This assessment is to identify risk exposure to asbestos while working at the Site. This assessment will be conducted at least annually.

**In addition to this assessment, a detailed risk assessment and survey must be performed before demolition, alteration or repair is carried out on any machinery, equipment, or structures.**

## 2.0 SCOPE

The risk assessments must be performed by a qualified person who will assess and document the following information:

- Condition of the material
- Friability of the material
- Accessibility of the material (i.e., how easily can the material be reached)
- Likelihood of damage
- Frequency of access

The annual inventory risk assessment must also be considered if an alternative to the currently used asbestos product is available and is feasible to use in the application.

During risk identification and assessment, unidentified asbestos-containing materials may be encountered and require sampling. If sampling confirms the material is asbestos containing, the inventory must be updated to reflect this discovery.

## 3.0 PROCEDURE

### 3.1 Risk Assessment Rating System

A risk assessment rating system will be used to assess the ACMs and for prioritizing remedial work. The system assigns a numerical rating for the following categories:

- Condition
- Friability
- Accessibility/Proximity
- Likelihood of Damage/Deterioration
- Frequency of Access

Each numerical value corresponds to a specific definition depending on the category. The rating system is defined in **Table 1** below:

**Table 1: Asbestos Risk Assessment Rating System Definitions**

Rating	Condition	Friability	Accessibility / Proximity	Likelihood of Damage / Deterioration	Frequency of Access
1	Good	Well-Bonded	Low	Low	Low
3	Fair	Moderate	Moderate	High	Moderate
5	Poor	High	High		High
9	Very Poor				

Each category contains two or more subcategories and are summarized as follows:

**Table 2: Asbestos Risk Assessment Subcategories**

Condition	
Good	Wrapping is intact where applicable and there is no water damage, physical damage, or deterioration.
Fair	Some minor damage or deterioration
Poor	There is significant evidence of water damage, physical damage, or deterioration. Wrapping breach is imminent.
Very Poor	Wrapping has been breached and asbestos material has been or could be dislodged and spread beyond the point of origin.
Friability	
Well Bonded	Materials that require mechanical assistance or tools to crumble or break. Examples include floor tiles, gasket materials, Transite panels.
Moderate	Materials that require some pressure with the fingers to break or crumble. Examples include some gasket and packing materials, spray-on texture, mudded elbow.
High	Materials that crumble easily upon contact with light finger pressure. Examples include spray-on stipple, aged aircell.
Accessibility / Proximity	
Low	Materials are enclosed or require scaffolding.
Moderate	Materials greater than arm length and require a 6-foot to 12-foot ladder.
High	Materials are within arm length or "touchable".
Likelihood of Damage / Deterioration	
Low	Materials are enclosed or do not have a potential for direct contact or disturbance.
High	Materials may be subject to physical impact, contact with liquid(s), vibration, or high air movement that can cause the material to become damaged or deteriorate.
Frequency of Access	
Low	Workers in the vicinity of the material less than once per month.
Moderate	Workers in the vicinity of the material at least once per month and up to once per week.
High	Workers in the vicinity of the material more than once per week.

For each material, **the sum** of the numerical values in the five categories will assist in determining the potential of fibre release and in determining the priority of remedial actions. The priority level is defined in the following scoring system:

**Table 3: Priority Level Rating**

<b>Total Rating Score</b>	<b>Potential of Fibre Release</b>	<b>Priority Level</b>	<b>Action</b>
17 to 29	High	A	Immediate response required.
13 to 15	Moderate	B	Increased monitoring until response is initiated to reduce hazard.
5 to 11	Low	C	Regular inspection, monitoring, and maintenance.

Depending on the score of the materials, controls such as removal, enclosure, or encapsulation may require immediate implementation. Information from this risk assessment can help in determining the type of work procedures (i.e., low, moderate, or high risk work) to be followed. Current scores for materials remaining on site are kept in the Asbestos Inventory.

# APPENDIX C

## Bulk Sampling Procedure

## 1.0 PURPOSE

This procedure is to ensure the safe bulk sampling of known and suspected asbestos-containing materials for use at NBT.

## 2.0 SCOPE

To detect the presence of asbestos in materials, bulk samples must be collected by a qualified person and analysed for asbestos content by an accredited laboratory.

Proper sampling techniques and controls must be in place to minimize both the disturbance of fibres and the exposure of sampler during sampling. When multiple layers are encountered, as may be the case when sampling flooring, care must be taken to sample all suspect layers.

Guidelines for determining the minimum samples required for a homogeneous material have been developed under the US EPA Asbestos Hazard Emergency Response Act (AHERA) and known as the “AHERA Rule”. WorkSafeBC has adopted the AHERA Rule and is summarized in **Figure 1** below:

## Appendix C – Bulk Sampling Procedure

Asbestos Management Plan  
 Neptune Bulk Terminals  
 1001 Low Level Road, North Vancouver, BC

Type of material	Area of homogeneous material*	Minimum number of bulk samples to be collected**	Minimum recommended quantity per sample	Type of material	Area of homogeneous material*	Minimum number of bulk samples to be collected**	Minimum recommended quantity per sample
Surfacing materials, including textured coatings, drywall mud, plasters, and stucco	Less than 90 m <sup>2</sup> (approximately 1,000 sq. ft.)	At least 3 samples of each type of surfacing material	50 cm <sup>3</sup> (3 cu. in.); for drywall mud, sample the mud only – do not include the drywall or tape	Levelling compounds and mortars	Any size	At least 3 samples	50 cm <sup>3</sup> (3 cu. in.)
	Between 90 and 450 m <sup>2</sup> (approx. 5,000 sq. ft.)	At least 5 samples of each type of surfacing material		Asbestos ropes, gaskets, wires, etc.	Any size	At least 1 sample	5 linear cm (2 linear in.) or 5 cm x 5 cm (2 in. x 2 in.)
	Greater than 450 m <sup>2</sup>	At least 7 samples of each type of surfacing material		Mechanical insulation, including duct taping, pipe insulation, elbows, and boiler/tank or vessel insulation	Any size	At least 3 samples	50 cm <sup>3</sup> (3 cu. in.); all layers must be collected down to the pipe, tank, or vessel
Sprayed insulation and blown-in insulation, including sprayed fireproofing	Less than 90 m <sup>2</sup> (approx. 1,000 sq. ft.)	At least 3 samples	50 cm <sup>3</sup> (3 cu. in.)	Mastics and putties, including duct mastic (around penetrations) and window putty	Any size	At least 3 samples	15 cm <sup>3</sup> (1 cu. in.)
	Between 90 and 450 m <sup>2</sup> (approx. 5,000 sq. ft.)	At least 5 samples		Roofing materials, including felting and shingles	Less than 90 m <sup>2</sup> (approx. 1,000 sq. ft.)	At least 1 sample (each layer of material must be sampled)	5 cm x 5 cm (2 in. x 2 in.); collect all layers, down to the sheathing
	Greater than 450 m <sup>2</sup>	At least 7 samples			Between 90 and 450 m <sup>2</sup> (approx. 5,000 sq. ft.)	At least 2 samples (each layer of material must be sampled)	
				Greater than 450 m <sup>2</sup>	At least 3 samples (each layer of material must be sampled)		
Loose vermiculite insulation (including vermiculite insulation within concrete masonry units, or CMUs)	Less than 90 m <sup>2</sup> (approx. 1,000 sq. ft.)	At least 3 samples	4 L (1 gal.); collect from the top to the bottom of the application to get a representative sample	Asbestos cement (transite) board and pipe	Any size	At least 1 sample	5 cm x 5 cm (2 in. x 2 in.)
	Between 90 and 450 m <sup>2</sup> (approx. 5,000 sq. ft.)	At least 5 samples		Other sprayed materials	Any size	At least 1 sample per type of material	1 full, small Ziploc bag
	Greater than 450 m <sup>2</sup>	At least 7 samples		Other non-friable products	Any size	At least 1 sample per type of material	5 cm x 5 cm (2 in. x 2 in.)
Ceiling tiles	Less than 90 m <sup>2</sup> (approx. 1,000 sq. ft.)	At least 3 samples	5 cm x 5 cm (2 in. x 2 in.)				
	Between 90 and 450 m <sup>2</sup> (approx. 5,000 sq. ft.)	At least 5 samples					
	Greater than 450 m <sup>2</sup>	At least 7 samples					
Flooring, including vinyl sheet flooring (and backing) and floor tiles	Any size	At least 1 sample per flooring type in each room (and 1 from each layer of flooring)	5 cm x 5 cm (2 in. x 2 in.)				

\* Homogeneous material is considered uniform in texture and appearance, was installed at one time, and is likely to be of only one type of material or formulation.

\*\* If the material is assumed to contain asbestos, samples do not have to be collected. The professional judgment of a qualified person can be used to reduce the number of bulk samples of homogeneous materials. If fewer samples than the minimum recommended number are collected, surveyors should document the rationale for their position in the survey report.

Figure 1: WorkSafe BC ACM Sampling Guide

### 3.0 EQUIPMENT AND MATERIALS

The following materials will be required for the safe bulk sampling of asbestos containing materials:

- Water in Spray Bottle
- Exacto knife, hook knife, or similar cutting tools
- Tweezers, scoop, or similar extraction tools
- Duct tape
- Caulking and caulking gun
- Plastic ZipLoc type bags
- Wiping cloths
- Asbestos Waste bag
- Disposable wet wipes

Optional Equipment: HEPA vacuum

### 4.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The minimum PPE required for bulk sampling of suspected or known asbestos-containing materials:

- Disposable Tyvek Coveralls (with integral head covering)
- Disposal Tyvek Booties
- Disposable latex or Nitrile gloves
- Half Face Air Purifying Respirator equipped with HEPA P100 Cartridges
- Safety Eyewear
- Safety Footwear

A note on Respiratory Protection: The selection of respiratory protection will vary with sampling conditions. The factors which affect respiratory protection selection include:

- Type of asbestos sampled
- Condition of asbestos
- Friable versus non-friable
- Location of ACMs

## 5.0 PROCEDURE

1. Assemble all required PPE, equipment, and materials, including disposable Tyvek coveralls (or similar) with integral head covering that fit snugly at the wrists and ankles, booties, half-face respirator with P100 HEPA cartridges, water mister, water supply, cutter tools, scoop, sample collection bags, wiping cloth or disposable talc-free wet-wipes, disposal bags, duct tape, and so on.
2. Put on Tyvek suit and disposable gloves. Determine whether ankles and wrists of coveralls need to be sealed (this may be necessary when sampling very friable material such as vermiculite insulation).
3. Mark the boundary of the sampling area (for example, with barrier tape) and signage. Inform any nearby workers of the potential asbestos hazard and instruct them to stay outside the area. Any worker in the sampling area must have full PPE.
4. Put on and fit-check the half-face air-purifying respirator.
5. Identify locations from which to collect bulk samples.
6. To minimize release of dust, use a water mister to wet the material to be sampled.
7. Use sampling tools to collect the desired sample, minimizing disturbance of the material and collecting only the amount necessary. If pieces break off during sampling, clean up the debris using a HEPA vacuum or by wet wiping. Where necessary, cover the area with poly drop sheets to catch and contain loose materials generated during sampling.
8. Place the collected sample in the sample bag and label the bag with collection details. Seal the sample bag.
9. Using wet wipes, wet paper towels, or a wet cloth, wipe up any visible material that may have fallen or become dislodged during sample collection.
10. Place all waste material (including wipes) in a designated asbestos waste bag.
11. Use duct tape, caulking, or other effective means where appropriate to seal sample collection locations where the sample collection may have resulted in minor damage to the material sampled. For example, after disturbing drywall or ceiling material, tape or caulk the area to seal it. Decontaminate (wipe) tools between sample collections and after completing all sample collections.
12. Record the location of the sample on the site map and take a photo of the sample location.
13. Using wet wipes, wipe down the exterior of all sample bags. Dispose of used wipes in the Asbestos Waste bag.
14. In a clean area, remove disposable Tyvek coveralls, booties, and gloves and place them in the Asbestos Waste bag. The method of waste disposal will depend on the quantity of the material generated.
15. In the clean area, remove and clean off the respirator. Use a wet cloth or wipe to clean any exposed skin areas.
16. Do a final check of all equipment.
17. Complete sample chain of custody, update sampling notes, and submit samples to an approved laboratory.



## **APPENDIX D**

### Asbestos Handling and Disposal Procedure

## 1.0 PURPOSE

This procedure is designed for the safe handling and disposal of waste asbestos generated at NBT.

## 2.0 SCOPE

ACMs have been identified at NBT. Waste asbestos can be generated through prescribed work or accidental disturbance. In most cases when asbestos is disturbed, asbestos waste is generated through removal or repair.

NBT staff are not trained in the handling and packaging of waste asbestos. Any handling, packaging, and disposal of waste will be done by an approved asbestos abatement contractor working on the NBT site. This procedure describes the minimum requirements that must be followed by an approved asbestos abatement contractor at NBT for the handling, packaging, and disposal of waste asbestos to the Vancouver Landfill or other permitted receiving sites.

## 3.0 REGULATORY FRAMEWORK

WorkSafeBC describes waste disposal as a Low-Risk activity and identifies the minimum Personal Protective Equipment that must be worn when performing this task.

The BC Hazardous Waste Regulation (BC Reg. 63/88 as amended) defines waste asbestos as “a waste containing friable asbestos fibres or asbestos dust in a concentration greater than 1% by weight” at the time of manufacture or as determined by a recognized analytical method. Section 40(2) of this regulation prescribes how waste asbestos must be packaged and disposed:

“A person must not deposit waste asbestos in a landfill other than a secure landfill unless

- a) a permit or an approval has been issued under the Act to operate the landfill, or the landfill is operated under a waste management plan,
- b) the waste asbestos is confined during handling, storage and transportation by
  - a. dry airtight containment techniques such as
    - i. packing in 6 mil plastic bags placed within a non-reuseable drum and then sealed, or
    - ii. packing in a 6 mil plastic bag placed within a second 6 mil plastic bag and then sealed, or
  - b. wet containment techniques such as saturation with water and containment in non-leaking sealed drums or equivalent, or
  - c. approved containment techniques,
- c) the waste asbestos is disposed of at the landfill by being immediately buried with a minimum of 0.5 m of cover material,
- d) approval of the landfill owner is received before disposal takes place, and
- e) the deposit is authorized by a director and carried out in accordance with the director's requirements.”

## 4.0 MATERIALS

Minimum required materials for waste asbestos disposal:

- Yellow asbestos disposal bags
- Yellow caution tape
- Duct tape

## 5.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Contractors handling waste asbestos will use the following PPE:

- Disposable Tyvek Coveralls
- Disposal Tyvek Booties
- Disposable latex or Nitrile gloves
- Half Face Air Purifying Respirator equipped with HEPA P100 Cartridges
- Safety Eyewear
- Safety Footwear

## 6.0 PROCEDURE

This procedure is for the packaging, handling, and disposal of sealed waste asbestos generated at NBT to the Vancouver Landfill or other permitted receiving sites by an approved asbestos abatement contractor retained for asbestos abatement work activities. The asbestos abatement contractor may have their own procedures, but they must contain the following elements at a minimum.

All activities will follow Low-Risk procedures as outlined below:

- All contractors handling asbestos waste must have knowledge of the hazards of asbestos.
- Put on prescribed PPE (Section 5).
- Asbestos wastes shall be placed in polyethylene bags (at least 0.15 mm/6-mil thick), double-bagged and goosenecked, and labelled/tagged as asbestos waste. This must be done inside the enclosed asbestos abatement work area.
- Bagged asbestos wastes shall be stored within the enclosed asbestos abatement work area until decontaminated. Prior to the transfer of double-bagged asbestos wastes outside of the asbestos work area, the outside of the polyethylene bags shall be decontaminated by damp-wiping or by cleaning with a HEPA vacuum.
- All asbestos waste materials shall be placed and sealed in polyethylene bags at the end of each shift.
- Contractors must ensure that a continuous cleanup and disposal program is in place to prevent unnecessary accumulation of asbestos waste materials.
- The contractor shall notify the receiving site when asbestos disposal is required.
- The contractor will arrange for transport of the double-bagged asbestos waste to the receiving site, handling with care to avoid damaging or breaking the bags. This includes avoiding any sharp edges that may cut the bag and, if it contains heavy objects, ensure that when the bag is picked up it does not tear.
- The contractor and or transporter will be expected to handle the waste asbestos bags and place them inside the transport vehicle.

Asbestos Management Plan

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- In the event that the contractor is authorized, in writing, to transport waste asbestos in their own trucks, the contractor will contact the receiving site to coordinate for the proper disposal of the waste asbestos.
- The receiving site is responsible for final disposal of the waste.

**NOTE: Should a waste asbestos bag rip open spilling the contents during handling and loading of the transport vehicle, the person in possession of the waste asbestos will barricade off the area to a minimum of 3 metres and then immediately notify the Health and Safety Coordinator and the Emergency Decontamination procedure (Appendix F) will be implemented.**

## **APPENDIX E**

### Unplanned Discovery of Asbestos Procedure

## 1.0 PURPOSE

This procedure provides the required steps that must be taken should previously undiscovered ACMs are encountered, or when known ACMs are disturbed, releasing fibres to the atmosphere.

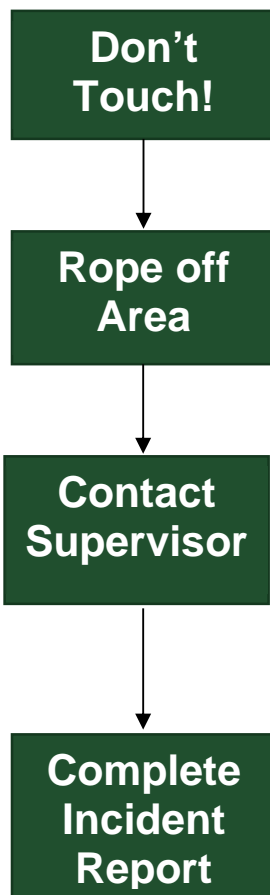
## 2.0 SCOPE

ACMs have been identified at NBT and are recorded in the Site Asbestos Inventory (**Appendix A**). When work is to be done around known ACMs there is always the possibility the ACM is accidentally disturbed, releasing fibres to the atmosphere and unexpectedly exposing workers.

This procedure will apply to all NBT employees and all contractors working at the Site.

### 3.0 PROCEDURE

In the event of a sudden discovery of a material that could be an ACM, or the unexpected release of asbestos, the following actions must be taken:



1. Do not touch or disturb the materials. If in doubt as to material composition, assume it is asbestos. Immediately leave the area.
2. Tape off the area using barrier tape to prevent others from disturbing the material or entering the area. Use tag to identify reason for barrier.
3. Advise the NBT Site Supervisor and Health and Safety Coordinator about this discovery.
4. If a contractor is involved, the contractor's company representative shall be contacted.
5. Complete Incident Report.
6. NBT Site Supervisor and Health and Safety Coordinator to determine whether immediate action is required or when action must be taken.
7. NBT Site Supervisor and Health and Safety Coordinator will arrange for a sample to be taken by a qualified person, following applicable WorkSafe BC guidelines and procedures, and analyzed by an accredited laboratory. This may require contacting a third-party qualified person.
8. If analysis tests positive for the presence of asbestos, then the NBT Site Supervisor and Health and Safety Coordinator will develop a plan of action.
9. If sample tests negative for asbestos, the NBT Site Supervisor and Health and Safety Coordinator will advise all affected personnel and normal work procedures will be followed.
10. If a worker suspects they have been exposed to asbestos, the emergency decontamination procedures shall be followed immediately, outlined in **Appendix F**.
11. A formal incident investigation must be held whenever an individual encounters asbestos unexpectedly or sustains an exposure to asbestos. The NBT Site Supervisor and Health and Safety Coordinator must ensure the investigation is held and must be attended by a NBT Supervisor.

## APPENDIX F

### Emergency Decontamination Procedure



## **1.0 PURPOSE**

This procedure gives the steps that must be taken in the event a worker is exposed to asbestos.

## **2.0 SCOPE**

ACMs have been identified at NBT. This procedure will apply to all NBT employees and all contractors working at the Site. Any person in an area where they have been or suspect they may have been exposed must not leave the area unless there is immediate danger and if so, move to a safe location and then proceed with the decontamination procedure.

## **3.0 PROCEDURE**

In the event of a sudden discovery of a material that could be ACMs, or the unexpected release of asbestos, the following actions must be taken. Any work requiring the handling, packaging, and disposal of ACM will be done by an approved abatement contractor (See **Appendix D – Asbestos Handling and Disposal Procedure**).

### 3.1 Emergency Asbestos Spill Clean-Up Procedure



1. If suspect ACMs were discovered during work and no ACMs were impacted/no asbestos fibre release, workers shall put on prescribed PPE outlined in Section 5 of **Appendix D** and dampen all friable material with closest available water source (e.g., water bottle, emergency shower, water hose, fire hose). The area must then be taped off, and asbestos hazards identified.
  - a. If the sudden discovery of suspect ACMs, or the unexpected release of asbestos occurs in an area not previously identified to contain ACMs, implement the Unplanned Discovery of Asbestos procedures outlined in **Appendix E**.
2. If asbestos fibres were released, the following steps must be taken:
  - a. Exposed workers must stop all work and move to an area close by, but away from the asbestos release.
  - b. Report asbestos exposure to NBT Supervisor and request assistance to retrieve clean clothing (e.g., coveralls), polyethylene bags (or any impervious container), and water.
  - c. Exposed workers shall dampen all exposed skin and hair with nearby available water source or water provided by assisting workers, then remove and place contaminated clothing into polyethylene bags.
  - d. Exposed workers shall put on provided clean clothing and seek medical attention.
  - e. Cordon off the area with Danger Tape to prevent access until an approved abatement contractor is available to provide cleanup.
  - f. Responding abatement contractor shall put on prescribed PPE outlined in Section 5 of **Appendix D** and handle the ACMs as appropriate.
3. All affected areas shall be cleaned up according to asbestos Emergency Asbestos Clean-up Procedure below, and follow the Asbestos Handling and Disposal procedures outlined in **Appendix D**.
4. Asbestos contaminated clothing must be disposed as asbestos waste (i.e., placed in polyethylene bags at least 0.15 mm thick (6-mil), double bagged, and labelled/tagged as asbestos).

NBT staff are not trained in the handling and packaging of waste asbestos. Any handling, packaging, and disposal of waste asbestos, including emergency clean up, will be done by an approved asbestos abatement contractor retained by NBT. This procedure describes the minimum requirements that must be followed by an approved asbestos abatement contractor at NBT for the handling, packaging, and disposal of waste asbestos.

### 3.1.1 Required Equipment

- Danger Tape
- Delineators
- HEPA Vacuum
- Water Spray Bottle
- 0.15 mm/6-Mil Polyethylene Asbestos Bags
- Duct Tape
- Dust Pan and Brush
- Half or Full-Face Respirator
- HEPA P100 Cartridges
- Tyvek Suit
- Rubber Gloves
- Eye Protection

### 3.1.2 Clean-Up Procedure

An asbestos abatement contractor will be retained to clean-up the release of asbestos fibres. The contractor may have their own procedures, but they must include the following elements at a minimum.

1. Secure the area and post signs to prevent unauthorized personnel from entering the area.
2. Put on a half or full-face respirator with HEPA P100 cartridges.
3. Put on a Tyvek suit, rubber gloves, eye protection.
4. Clean up loose asbestos with a HEPA vacuum, do not use a regular vacuum.
5. If a HEPA vacuum is not available, wet down the area with amended water (water in which a few drops of liquid laundry detergent have been added).
6. Place all wastes into two 0.15 mm (6-mil) polyethylene bags, gooseneck the bags, and label/tag as asbestos waste.
7. Decontaminate clean-up equipment.
8. Wipe the area clean.
9. Arrange for disposal of waste asbestos.

## **APPENDIX G**

### Emergency Removal of Injured Asbestos Worker

## **1.0 PURPOSE**

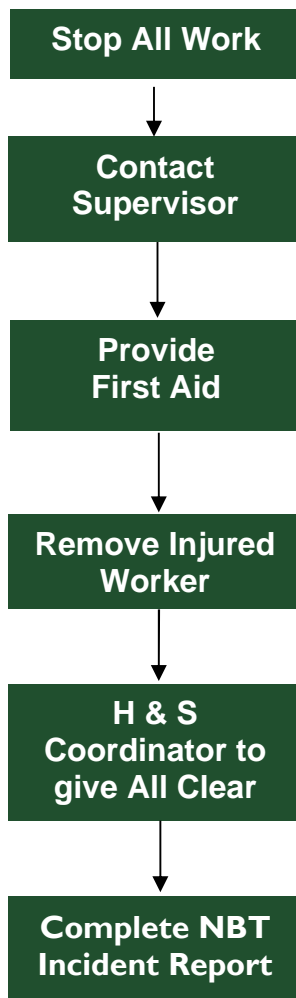
In the unlikely event an asbestos worker is injured, this procedure for removal of an injured asbestos worker from the abatement work area will be used.

## **2.0 SCOPE**

ACMs have been identified at NBT. This procedure will apply to all NBT employees and all contractors working at the Site.

### 3.0 PROCEDURE

In the event an asbestos worker is injured and there is risk of the presence of asbestos fibres on the worker's PPE, the following actions must be taken:



1. Stop all work in the asbestos work area and request all non-essential personnel to leave the area.
2. Contact NBT Site Supervisor. NBT Supervisor to contact Health and Safety Coordinator. In life-threatening situations, 911 should be called.
3. Provide first aid and remove injured worker from the asbestos work area while limiting the release of asbestos fibres.
  - a. First responders (e.g., first aid attendants, paramedics) without asbestos training must be warned of the hazards and be provided with, and told how to use, respirators, coveralls, and relevant PPE before entering the asbestos work area.
  - b. For emergencies, standard protective measures may be temporarily ignored if they would otherwise cause an immediate threat to the worker's life or recovery (e.g., a worker's respirator may be immediately removed for resuscitation procedure (mouth-to-mouth or bag valve mask), or a worker's contaminated clothing may be left on if spinal injury is suspected).
  - c. If PPE can be left in place without interfering with emergency care of the injured worker in the asbestos work area, they should not be removed until the worker has been brought to the designated decontamination or an uncontaminated area.
  - d. Standard decontamination procedures should be carried out only if they do not interfere with medical emergency procedures, and should take place in designated decontamination areas or in an enclosed area to minimize risk of contaminating other areas outside of the asbestos work area. All areas outside of the asbestos work area that was used for emergency scenarios must be decontaminated.
  - e. If injured worker could not be decontaminated, they must be covered to minimize contamination of clean areas but should not hinder access for first responders. Someone familiar with handling and disposal of asbestos-contaminated clothing should accompany the patient to the hospital, and the hospital must be notified of the asbestos-contaminated patient.
4. NBT Supervisor and Health and Safety Coordinator must take steps to ensure the return of safe work environment and the integrity of the asbestos enclosure prior to re-commence work. All areas must be decontaminated/cleaned, following the Handling and Disposal, and Clean-Up procedures in **Appendix D** and **F**.
5. Complete NBT Incident Report.