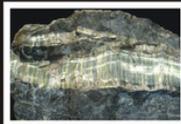


# ASBESTOS MANAGEMENT PROGRAM

## ASBESTOS



CHRYBOTILE



AMOSITE



CROCIDOLITE



TREMOLITE



ACTINOLITE



ANTHOPHYLLITE

## Real Property Operations Unit (Pacific)

CFB Esquimalt, CFB Comox, CFB Chilliwack and Mainland BC

Effective Date

**September 2016**

# FOREWORD

The Real Property Operations Unit Pacific (RP Ops U(P)) Asbestos Management Plan has been developed in accordance with applicable federal and provincial Occupational Health and Safety Regulations and good industry practices to ensure the safe management of asbestos containing materials. This manual shall be updated as necessary to reflect changes in applicable legislation, however, should there be discrepancies between this manual and the minimum standards under legislation, the latter shall prevail.

All efforts have been implemented to complete the manual as being gender neutral. If there is any reference in this manual to a specific gender, the full intention is to refer to all persons, regardless of gender.

The RP Ops U(P) Asbestos Management Plan applies to all RP Ops U(P) sections located in the Pacific Region: CFB Esquimalt; CFB Comox; and CFB Chilliwack and Mainland BC.

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# Glossary of Terms

## ***Abatement***

"Abatement" shall mean any and all procedures physically taken to control fibre release from asbestos-containing materials. This includes removal, encapsulation, enclosure and repair.

## ***Abatement activities***

"Abatement activities" shall mean all activities from the initiation of work area preparation through successful clearance air monitoring performed at the conclusion of an asbestos project or minor project.

## ***Aggressive sampling***

"Aggressive sampling" shall mean a method of sampling in which the individual collecting the air sample creates activity by the use of mechanical equipment during the sampling period to stir up settled dust and to simulate activity in that area of the building.

## ***AHERA***

"AHERA" shall mean the Asbestos Hazard Emergency Regulation Act as created by the United States Environmental Protection Agency.

## ***AIHA***

"AIHA" shall mean the American Industrial Hygiene Association.

## ***Airlock***

"Airlock" shall mean a system for permitting entrance and exit while restricting air movement between a contaminated area and an uncontaminated area. It consists of two curtained doorways separated by a distance of at least three feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow through contamination.

## ***Air sampling***

"Air sampling" shall mean the process of measuring the fibre content of a known volume of air collected during a specific period of time. The procedure utilized for asbestos follows the WCB Standard Analytical Method 2101 or the provisional transmission electron microscopy methods developed by the USEPA and/or National Institute of

Science and Technology which are utilized for lower delectability and specific fibre identification.

# Glossary of Terms

## ***Ambient air monitoring***

"Ambient air monitoring" shall mean measurement or determination of airborne asbestos fibre concentrations outside but in the general vicinity of the worksite.

## ***Amended water***

"Amended water" shall mean water to which a surfactant has been added.

## ***ANSI***

"ANSI" shall mean the American National Standards Institute.

## ***Area air sampling***

"Area air sampling" shall mean any form of air sampling or monitoring where the sampling device is placed at some stationary location.

## ***Asbestos***

"Asbestos" shall mean any hydrated mineral silicate separable into commercially usable fibres, including but not limited to chrysotile (serpentine), amosite (cuming-tonite-grunerite), crocidolite (riebeckite), tremolite, anthrophyllite and actinolite.

## ***Asbestos containing material***

"Asbestos containing material" (ACM) shall mean asbestos or any material containing more than one percent asbestos.

## ***Asbestos containing waste material***

"Asbestos containing waste material" shall mean asbestos-containing material or asbestos contaminated objects requiring disposal.

## ***Asbestos contaminated objects***

"Asbestos contaminated objects" shall mean any objects, which have been contaminated by asbestos or asbestos containing material.

## ***Asbestos handler***

"Asbestos handler" shall mean an individual certified by CFB Esquimalt who disturbs, removes, encapsulates, repairs, or encloses friable asbestos material.

# Glossary of Terms

## ***Asbestos handler supervisor***

"Asbestos handler supervisor" shall mean an individual certified by CFB Esquimalt who supervises the handlers during an asbestos project and ensures that proper asbestos abatement procedures as well as individual safety procedures are being adhered to.

## ***Asbestos Inspection Report***

"Asbestos Inspection Report" shall mean a report on the condition of a building or structure in relation to the presence and condition of asbestos therein.

## ***Asbestos Surveyor***

"Asbestos Surveyor" shall mean an individual certified by AHERA as having satisfactorily demonstrated his or her ability to identify the presence and evaluate the condition of asbestos in a building or structure.

## ***Asbestos Project***

"Asbestos project" shall mean any form of work performed in connection with the alteration, renovation, modification or demolition of a building or structure which will disturb (e.g., remove, enclose, encapsulate) friable asbestos containing material.

## ***ASTM***

"ASTM" shall mean the American Society for Testing and Materials.

## ***Authorized Visitor***

"Authorized visitor" shall mean the building owner and his/her representative, and any representative of a regulatory or other agency having jurisdiction over the project.

## ***Boiler room equipment***

"Boiler room equipment" or "fuel-burning equipment" shall mean equipment designed to burn fuel for the purpose of generating hot water, steam, and/or heat, including all ancillary equipment and associated piping. For boiler rooms other than those located in electric and steam utility generating stations, the ancillary equipment and associated piping shall be limited to that within the room containing the main equipment; or where there is no such room, located on the floor where the main equipment is located.

# Glossary of Terms

## ***Bulk Sampling***

"Bulk Sampling" shall mean a sample or samples taken during the hazard assessment. Representative samples of all material suspected to contain asbestos are taken for phase contrast microscopy.

## ***Certified industrial hygienist***

"Certified industrial hygienist" (CIH) shall mean an individual with a minimum of five years experience as an industrial hygienist and who has successfully completed both levels of the examination administered by the American Board of Industrial Hygiene and who is currently certified by that Board.

## ***Certified Safety Professional (CSP)***

"Certified safety professional" (CSP) shall mean an individual having a bachelor's degree from an accredited college or university and a minimum of four years experience as a safety professional and who has successfully completed both levels of the examination administered by the Board of Certified Safety Professionals and who is currently certified by that Board.

## ***Clean Room***

"Clean room" shall mean an uncontaminated area or room, which is part of the worker decontamination enclosure system with provisions for storage of workers' street clothes and protective equipment.

## ***Clearance air monitoring***

"Air clearance monitoring" shall mean the employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibres, and shall be performed as the final abatement activity.

## ***Contractor***

"Contractor" shall mean a public authority or any other governmental agency or instrumentality thereof, self-employed person, company, unincorporated association, firm, partnership or corporation and any owner or operator thereof, which engages in an asbestos project or employs persons engaged in an asbestos project.

## ***Curtained doorway***

"Curtained doorway" shall mean a device, which consists of at least three overlapping sheets of plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and left side. All sheets shall have weights attached to the bottom to ensure that the sheets hang straight and maintain a seal over the doorway when not in use.

# Glossary of Terms

## ***Decontamination enclosure system***

"Decontamination enclosure system" shall mean a series of connected rooms, separated from the work area and from each other by air locks, for the decontamination of workers, materials, waste containers, and equipment.

## ***Diethyl Phthalate [DOP] Testing***

"DOP testing" shall mean the process for testing the effectiveness of HEPA filtered equipment at removing asbestos fibres from the air. The test requires introducing a stream of aerosol [diethyl phthalate] particles [ 0.3 um or larger] on the upstream side of an operating HEPA filter and measuring the downstream side of the filter with a particle detector.

## ***Disturb***

"Disturb" shall mean any action taken, which may alter; change, or stir; such as but not limited to the removal, encapsulation, enclosure or repair of asbestos-containing material.

## ***Encapsulant (sealant) or encapsulating agent***

"Encapsulant (sealant) or encapsulating agent" shall mean pigmented (non-transparent) liquid material which can be applied to asbestos-containing material or the bare surfaces exposed after an abatement which temporarily controls the possible release of asbestos fibres from the material or surface either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).

## ***Encapsulation***

"Encapsulation" shall mean the coating or spraying of asbestos containing material or the bare surfaces exposed after abatement with a pigmented (non-transparent) sealant.

## ***Enclosure***

"Enclosure" shall mean the construction of airtight walls and ceilings between the ACM and the facility environment, or around surfaces coated with ACM, or any other appropriate procedure as determined by CFB Esquimalt, which prevents the release of asbestos fibres.

## ***EPA***

"EPA" or "USEPA" shall mean the United States Environmental Protection Agency.

# Glossary of Terms

## ***Equipment room***

"Equipment room" shall mean a contaminated area or room, which is part of the worker decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.

## ***Fibre***

"Fibre" shall mean an acicular single crystal or a similarly elongated polycrystalline aggregate which displays some resemblance to organic fibres by having such properties as flexibility, high aspect ratio, silky luster, axial lineation, and others, and which has attained its shape primarily through growth rather than cleavage.

## ***Fixed object***

"Fixed object" shall mean a unit of equipment or furniture in the work area, which cannot be removed from the work area.

## ***Friable asbestos material***

"Friable asbestos material" shall mean any asbestos or any ACM that can be crumbled, pulverized or reduced to powder when dry, by hand or other mechanical pressure.

## ***Glovebag technique***

"Glovebag technique" shall mean a method for removing friable asbestos-containing material from heating, ventilation and air conditioning (HVAC) ducts, short piping runs, valves, joints, elbows, and other nonplanar surfaces. The glovebag assembly is a manufactured device consisting of a large bag (constructed of at least 6-mil transparent plastic), two inward-projecting long sleeve gloves, one inward-projecting water wand sleeve, an internal tool pouch, and an attached, labelled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibres released during the removal process.

## ***HEPA filter***

"HEPA filter" shall mean a high efficiency particulate air filter capable of trapping and retaining 99.97 percent of particles including asbestos fibres greater than 0.3 micrometers mass median aerodynamic equivalent diameter.

## ***HEPA vacuum equipment***

"HEPA vacuum equipment" shall mean vacuuming equipment with a HEPA filter.

# Glossary of Terms

## ***Holding area***

"Holding area" shall mean a chamber in the equipment decontamination enclosure located between the washroom and an uncontaminated area.

## ***Homogeneous work area***

"Homogeneous work area" shall mean a portion of the work area, which contains one type of asbestos-containing material and/or where one type of abatement is used.

## ***Industrial hygiene***

"Industrial hygiene" shall mean that science and art devoted to the recognition, evaluation and control of those environmental factors or stresses, arising in or from the work place, which may cause sickness, impaired health and well being, or significant discomfort and inefficiency among workers or among the citizens of the community.

## ***Industrial hygienist***

"Industrial hygienist" shall mean an individual having a college or university degree or degrees in engineering, chemistry, physics, or medicine or related biological sciences who, by virtue of special studies and training, has acquired competence in industrial hygiene. Such special studies and training must have been sufficient in all of the above cognate sciences to provide the abilities:

## ***Isolation barrier***

"Isolation barrier" shall mean the construction of partitions, the placement of solid materials, and the plasticizing of apertures to seal off the work place from surrounding areas and to contain asbestos fibres in the work area.

## ***Large asbestos project***

"Large asbestos project" shall mean an asbestos project involving the disturbance (e.g., removal, enclosure, encapsulation) of a significant amount of friable asbestos-containing material.

## ***Log***

"Log" shall mean an official record of all activities that occurred during the project and it shall identify the building owner, agent, contractor, and workers, and other pertinent information (e.g., equipment malfunctions, contamination beyond the work area, etc.).

# Glossary of Terms

## ***Minor violation***

"Minor violation" shall mean any action, on the job performance or lack of performance that may place the worker at risk.

## ***Movable object***

"Movable object" shall mean a unit of equipment or furniture in the work area, which can be removed from the work area.

## ***Negative air pressure equipment***

"Negative air pressure equipment" shall mean a portable local exhaust system equipped with HEPA filtration. The system shall be capable of creating a negative pressure differential between the outside and inside of the work area.

## ***NIOSH***

"NIOSH" shall mean the National Institute for Occupational Safety and Health CDC – NIOSH.

## ***Occupied area***

"Occupied area" shall mean an area of the work site where abatement is not taking place and where personnel or occupants normally function or where workers are not required to use personal protective equipment.

## ***Outside air***

"Outside air" shall mean the air outside the work place.

## ***Person***

"Person" means any individual, partnership, company, corporation, association, firm, organisation, governmental agency, administration or department, or any other group of individuals, or any officer or employee thereof.

## ***Personal air monitoring***

"Personal air monitoring" shall mean a method used to determine employees' exposure to airborne fibres. The sample is collected outside the respirator in the worker's breathing zone. [Also called occupational air sampling.]

## ***Personal protective equipment***

"Personal protective equipment" (PPE) shall mean appropriate protective clothing, gloves, eye protection, footwear, headgear and respirators.

# Glossary of Terms

## ***Phase contrast microscopy***

"Phase contrast microscopy" (PCM) shall mean the measurement protocol for the assessment of the fibre content of air. (NIOSH Method 7001).

## ***Plasticize***

"Plasticize" shall mean to cover floors and walls with plastic sheeting as herein specified or by using spray plastics as acceptable to CFB Esquimalt.

## ***Polarized light microscopy***

"Polarized light microscopy" (PLM) shall mean the measurement protocol for the assessment of the asbestos content of bulk materials.

## ***Qualitative fit test***

"Qualitative fit test" shall mean the individual test subject's responding (either voluntarily or involuntarily) to a chemical challenge outside the respirator facepiece. Three of the most popular methods include:

- Irritant smoke test;
- Odorous vapour test;
- Taste test.

## ***Quantitative fit test***

"Quantitative fit test" shall mean exposing the respirator wearer to a test atmosphere containing an easily detectable, non-toxic aerosol, vapour or gas as the test agent. Instrumentation, which samples the test atmosphere and the air inside the facepiece of the respirator, is used to measure quantitatively the leakage into the respirator. There are a number of test atmospheres, test agents, and exercises to perform during the tests.

## ***Removal***

"Removal" shall mean the stripping of any asbestos-containing materials from surfaces or components of a facility or taking out structural components in accordance with WCB regulation.

## ***Repair***

"Repair" shall mean corrective action using specified work practices e.g. glovebag, plastic tent procedures, etc. to minimize the likelihood of fibre release from minimally damaged areas of ACM.

# Glossary of Terms

## ***Replacement material***

"Replacement material" shall mean any material used to replace ACM that contains no asbestos.

## ***Shift***

"Shift" shall mean a worker's, or simultaneous group of workers' complete daily term of work.

## ***Shower room***

"Shower room" shall mean a room between the clean room and the equipment room in the worker decontamination enclosure with hot and cold running water controllable at the tap and arranged for complete showering during decontamination.

## ***Small asbestos project***

"Small asbestos project" shall mean an asbestos project involving the disturbance (e.g., removal, enclosure, encapsulation) of less than one square foot of friable asbestos-containing material.

## ***Staging area***

"Staging area" shall mean the work area near the waste transfer airlock where containerised asbestos waste has been placed prior to removal from the work area.

## ***Strip***

"Strip" shall mean to remove friable asbestos materials from any part of the facility.

## ***Surface barriers***

"Surface barriers" shall mean the plasticizing of walls, floors, and fixed objects within the work area to prevent contamination from subsequent work.

## ***Surfactant***

"Surfactant" shall mean a chemical wetting agent added to water to improve penetration.

## ***Transmission electron microscopy (TEM)***

"Transmission electron microscopy (TEM)" shall mean the measurement protocol for the assessment of the asbestos fibre content of air. (Interim Transmission Electron Microscopy Analytical Methods - 40 CFR Part 763, Subpart E, Appendix A)

# Glossary of Terms

## ***Visible emissions***

"Visible emissions" shall mean any emissions containing particulate material that are visually detectable without the aid of instruments.

## ***Waste decontamination enclosure system***

"Waste decontamination enclosure system" shall mean the decontamination enclosure system designated for the controlled transfer of materials and equipment, consisting of a washroom and a holding area.

## ***Wet cleaning***

"Wet cleaning" shall mean the removal of asbestos fibres from building surfaces and objects by using cloths, mops, or other cleaning tools, which have been dampened with water.

## ***Wet methods***

"Wet methods" shall mean the use of amended water or removal encapsulants to minimize the generation of fibres during ACM disturbance.

## ***Work area***

"Work area" shall mean designated rooms, spaces, or areas of the building or structure where asbestos abatement activities take place. For glovebag procedures, the work area shall also include the areas contiguous to where the procedure takes place.

## ***Worker***

"Worker" shall mean asbestos handler and/or asbestos handler supervisor.

## ***Worker decontamination enclosure system***

"Worker decontamination enclosure system" shall mean that portion of a decontamination enclosure system designed for controlled passage of workers, and other individuals and authorized visitors, consisting of a clean room, a shower room, and an equipment room separated from each other and from the work area by airlocks and curtained doorways.

## ***Work site***

"Work site" shall mean premises where asbestos abatement activity is taking place, and may be composed of one or more work areas.

# Part 1 Asbestos History and Overview

## 1. Types of Asbestos

Asbestos is a generic term given to a group of naturally occurring fibrous hydrated mineral silicates that possess a unique crystalline structure. The name asbestos comes from the Greek word meaning 'indestructible.' Asbestos is mined primarily from open pits in many countries including Canada, Russia, United States, China, South Africa and Australia.

There are over thirty different varieties of asbestos in existence but only a few have commercial importance. Of these there are two main groups; the serpentines and the amphiboles.

### .1 Serpentine

The serpentine group includes only chrysotile or "white" asbestos. Chrysotile fibres have hollow centres, like a scroll of paper and are curly or wavy in physical appearance under the light microscope. Bundles of chrysotile fibres easily fracture along their length into smaller bundles and individual fibres. Individual fibres cannot be easily seen under the light microscope. The ends of the smaller bundles of fibres may look like unravelled rope.

### .2 Amphiboles

Amphiboles are distinguished through their chain-like structures and chemical composition. The amphibole group of asbestos includes;

#### 2.1. Amosite

Generally referred to as "brown" asbestos. Amosite asbestos, like the rest of the members of the amphibole family, is composed of straight, rod-like fibres, which have a solid structure. Amosite fibres themselves are rectangular in shape, and will usually break before bending. The ends of smaller amosite fibre bundles appear broom-like under the light microscope.

#### 2.2. Crocidolite

Referred to as "blue" asbestos, it has relatively long thin fibre bundles, with broom-like ends. Crocidolite fibres are curvilinear, and needle-like in nature. They have a greater tendency to bend than amosite fibres.

#### 2.3. Actinolite and Tremolite

Fibres appear to behave similarly. They are not usually found as true fibres, but rather remain in crystal form.

# Part 1 Asbestos History and Overview

## 2.4. Anthophyllite

Sometimes found as single crystals, and sometimes found in fibrous form. Anthophyllite fibres are rectangular in shape, similar to amosite.

## 2. Definition of Asbestos Containing Material (ACM)

An asbestos containing material is defined as;

*“Any material or manufactured article containing asbestos that is at or above the limits defined in federal and provincial legislation as determined by the standard Polarized Light Microscopy (PLM) method of analysing bulk samples.”*

In the province of British Columbia it is considered to be 1.0% by mass.

## 3. Analytical Definition of a Fibre

Asbestos fibres share similar length to width aspect ratios, providing a means for analytical classification as described below;

- the length of the fibre must be greater than 5 micrometers and;
- the diameter or width of the fibre must be less than 3 micrometers, and the fibre must meet a defined aspect ratio, represented as;

$$\text{aspect ratio} = \frac{\text{length}}{\text{width}}$$

The length to width aspect ratio is calculated by the particular analytical method used to count fibres under the microscope, including;

- National Institute of Occupational Health and Safety (NIOSH) Analytical Method 7400 - aspect ratio = 3:1

The average diameter of an asbestos fibre is 0.11 micrometers to 0.24 micrometers. By comparison, the diameter of a human hair is 600 times greater.

# Part 1 Asbestos History and Overview

## 4. Where Asbestos is Found

Asbestos can be found in any industrial or residential building built or refurbished before the year 2000. It is in many of the common materials used in the building trade that you may come across during your work. Asbestos can be found in the following locations or applications:

- Asbestos Cement
- Ceiling tiles
- Construction glues and putties
- Drywall mud
- Flooring cement
- Grout
- Loose fill insulation (vermiculite, zonolite)
- Lagging on pipes and boilers
- Partition walls, panels in fire doors
- Seals and gaskets
- Sprayed coatings (on ceilings, walls, beams, and columns)
- Sprayed on insulation
- Textured wall ceiling coatings
- Toilet seats and cisterns
- Vinyl floor tiles

## 5. Classification

Asbestos containing materials are classified into different groupings. One classification system describes these materials as being either friable or non-friable, defined as;

### **Friable**

Means a material, when dry, that can easily be crumbled or powdered by hand. Friable materials containing asbestos may appear; fluffy or spongy (always applied by spraying); irregular, soft surface (usually applied by spraying); or textured, dense, fairly firm surface (usually applied by trowelling). Examples of friable asbestos containing materials include fireproofing, acoustic plaster, and mechanical insulating cements.

### **Non-friable**

Means a material that, when dry, cannot be easily crumbled or powdered by hand. Examples of non-friable asbestos containing materials include; floor tiles, brake shoes, mastics and putties, cement boards and pipes.

# Part 2 Legislative Concerns

## 1. Jurisdiction for Health & Safety Regulation

The Canada Labour Code Part II - Canadian Occupational Health and Safety Regulations [COHSR] stipulates that activities essential to the operation of the federal government come under federal jurisdiction in matters of health and safety. RP Ops U(P) is directly engaged in infrastructure management and operations and is subject to federal health and safety legislation.

Contractors that provide goods and services to the DND are not deemed under the federal COHS regulations and come under the provincial WorkSafeBC Occupational Health and Safety [OH&S] Regulation in matters of health and safety for issues pertaining to their employees.

Under COHSR, RP Ops U(P) must ensure that applicable health and safety standards are maintained for infrastructure pursuant to the federal legislative requirements. However where possible and where there is no conflict with DND operations, the Asbestos Management Plan will meet or exceed the standards established in both federal and provincial legislation.

Where contractors are used, the provincial legislation and guidelines will apply to their employees and worksites controlled by them.

## 2. Canadian Occupational Health and Safety Regulations

Referencing COHS Regulation Part X, Hazardous Substances; Section 10.19 (1)

“A federal employee shall be kept free from exposure to a concentration of an airborne chemical agent other than grain dust or airborne chrysotile asbestos, in excess of the value adopted by the American Conference of Governmental Industrial Hygienists (ACGIH), in its publication entitled Threshold Limit Values and Biological Indices, dated 1999, as amended from time to time;

“Airborne chrysotile asbestos in excess of point one fibre per cubic centimetre [0.1 f/cc].”

The American Conference of Governmental Industrial Hygienists 1999 Threshold Limit Values (TLV's) for asbestos (excluding chrysotile asbestos) are currently as follows:

Amosite	0.1 fibres/cubic centimetre
Crocidolite	0.1 fibres/cubic centimetre
All other forms	0.1 fibres/cubic centimetre

## Part 2 Legislative Concerns

### 3. Provincial Occupational Health and Safety Regulation

Referencing WorkSafeBC of BC Occupational Health & Safety [OH&S] Regulation, Part 6: Substance Specific Requirements; 6.3 – General Requirements;

“If a provincial worker is or may be exposed to potentially harmful levels of asbestos, the employer must develop and implement an exposure control plan meeting the requirements of section 5.54.”

Referencing WorkSafeBC OH&S Regulation Part 5: Chemical and Biological Substances, Table 5: Exposure Limits and Regulations;

Asbestos; All forms, Time Weighted Average (TWA) 8 hour exposure limit:

- 0.1 fibres per millilitre [f/cc]

### 4. DND/CF Regulations and Guidelines

The Department of National Defence (DND) has developed “DND/CF Asbestos Management Directive”, November 20, 2007, for the management of ACMs in DND facilities. This directive is the guiding document for the DND and outlines the processes and procedures that are to be applied to asbestos work. This document takes precedence except where it is in conflict with federal legislation or Treasury Board policy.

### 5. Non-Occupational Exposure Limits

As shown above, federal and provincial occupational health and safety regulation both stipulate maximum allowable exposure limits for persons whose work activities directly involve the use of the hazardous substance.

Federal and provincial occupational health and safety regulations apply the same standard for determining non-occupational exposure limits for workers to hazardous substances. Both have adopted the ACGIH standard of occupational exposure limits set out as time weight averages. At present the allowable asbestos exposure limit is the ACGIH Threshold Limit Value of .1 f/cc, regardless of asbestos type.

Though not specifically embedded in legislation, it is general industry practice to keep the exposure of office workers (non-asbestos workers) to a limit 1/10 of that expressed as a TLV. Action limits, or the point at which PPE should be donned is generally accepted to be at 50% of a TLV. This is not always practical and is only a general rule of thumb. RP Ops U(P) will work to achieve that standard where it is reasonably possible to do so.

## Part 2 Legislative Concerns

In the interest of a proactive safety program and the safety of personnel, RP Ops U(P) will endeavour to maintain airborne asbestos levels below 0.01 f/cc, expressed as a time weighted average, in areas occupied by non-asbestos workers.

### 6. Hazardous Waste Regulations

The Transportation of Dangerous Goods Regulations (TDG) classified white and blue asbestos as a hazardous substance. Consequently, all waste containing more than 1% asbestos content must be accompanied by a waste manifest to the landfill when travelling in Canada.

In addition to being federally regulated, asbestos waste is classified as a Special Waste under the British Columbia Waste Management Act, requiring that BC Environment be informed of asbestos waste in addition to Environment Canada and the Department of Transportation.

# Part 3 Asbestos Management Strategy and Plan

## 1. Management Plan

Asbestos is found in a wide variety of materials used during the original construction of Base buildings and armouries. To ensure these asbestos containing materials are not subject to uncontrolled fibre release, an essential component of this Program shall be the identification and assessment of all suspect materials.

Ascertaining the locations and condition of asbestos containing materials will provide a framework for future decisions regarding management of these materials. Identification shall be accomplished through a comprehensive baseline survey completed in accordance with the ASTM Standard, accompanied by a hazard assessment of each identified ACM to evaluate its respective potential for fibre release, and by labelling ACMs in accordance with this plan. Following the survey and assessment findings, three options are currently available to manage identified asbestos containing materials.

The policy of the federal government and the DND is to manage the ACM in place. The strategy of managing in place represents the required level of action required to ensure that ACM's are properly managed. Generally speaking, the material will be in good condition and not susceptible to external factors that could lead to deterioration and subsequent fibre release. Under these criteria the ACM's are inspected cyclically to evaluate whether deterioration and/or external factors are precipitating potential fibre release.

If no change in condition is determined during the cyclical condition re-assessment, no additional action(s) will be required in continuance of safe management of the material. However, should the re-assessment determine deterioration or external factors causing degradation, the ACM will be contained and re-categorized to the appropriate action level as detailed below.

### **.1 Strategic Abatement**

Material in this category will have been assessed as having the potential for future fibre release unless some remedial action(s) are initiated. The hazard assessment shall provide details of the current status of the material along with any recommended actions necessary to ensure that the potential for further deterioration or fibre release is prevented. Strategic abatement materials shall be prioritized for funding and action in the next capital allocation.

### **.2 Immediate Priority**

Material in this category will have been assessed as requiring immediate remedial action. Wherever possible the material will be abated forthwith, however circumstances may arise where temporary protective measures will be instituted to ensure proper containment until abatement can be initiated.

# Part 3 Asbestos Management Strategy and Plan

## 2. Regional Asbestos Management Program Administrator

The RP Ops U(P) Risk Management Officer is the Asbestos Program Administrator, acting on behalf of the Commanding Officer, RP Ops U(P) to develop, maintain, and implement the Asbestos Management Program and Plan for Pacific Region.

To assist in the implementation of the plan, the AMP Administrator may designate Asbestos Work Coordinators (AWC) in each Section. Where an AWC has been appointed in a Section, they will be trained to the standard and level defined in this Plan and may be called upon to conduct, assist or arrange for initial ACM assessment, containment, and work classification.

## 3. Baseline ACM Surveys (Asbestos Inventories)

The Baseline Survey is intended to address the long-term aspects of asbestos management. RP Ops U(P) will conduct baseline surveys as outlined in the ASTM Standard Practice for Comprehensive Building Asbestos Survey E 2356.

At a minimum, the baseline survey should include the following information in the report:

- .1 The building number, a description of the building or facility, the use and occupancy of the building, its locations and the representative tenant;
- .2 Building or facility characteristics, including basic dimensions, mechanical systems and construction materials;
- .3 Credentials of the inspector(s);
- .4 A description of the inspection, assessment, and bulk sampling methodology;
- .5 A list of all the functional spaces/rooms inspected and those excluded (with reasons);
- .6 A list of all homogeneous areas sampled and those excluded (with reasons);
- .7 Floor plans showing the locations of functional spaces inspected and homogeneous areas sampled and those excluded, with locations of ACM plotted on the floor plan;
- .8 A list of the bulk samples with location, type of material, physical description, condition, results of analysis (asbestos content – type and percent – plus other major components)
- .9 A tabulation of the assessment and quantities of all confirmed ACM;
- .10 Hazard Analysis of the ACM based upon the friability, condition, accessibility, frequency of access, potential for disturbance of material (as defined in Part 5)
- .11 Conclusions and recommendations for management of the ACM.

## Part 3 Asbestos Management Strategy and Plan

The final report of the survey shall include tables and drawings identifying sampling locations, material, laboratory results including percentage (%) and type of asbestos, accessibility, condition of materials, and hazard analysis scoring. The drawings must clearly define the locations and areas in which ACM is present in the building. The report should include a summary of the hazard assessment and recommendations.

The AMP Administrator is responsible for maintaining the asbestos inventories for the infrastructure supported by RP Ops U(P). The AMP Administrator shall make inventory information readily available and accessible to Formation/Wing Safety organizations and Building Managers.

### **4. Periodic/Cyclical Condition Inspections**

After completion of the baseline surveys, RP Ops U(P) will coordinate cyclical condition assessments of the ACM previously surveyed. The condition assessments will update the hazard assessment to reflect current condition and will initiate remediation and repair activity as required. RP Ops will endeavour to complete formal cyclical condition assessments every three years.

In between the formal assessments, informal inspections are to be conducted by Worksite Safety Committees and by RP Ops staff as they encounter ACMs during their normal work routines. Any condition anomalies are to be brought to the attention of the applicable Building Manager who in turn will contact RP Ops to raise a CF 141 Workorder.

At the beginning of each year and prior to the commencement of condition assessment cycles at each Section, the AMP Administrator will liaise with the Formation/Wing Safety organizations to advise them of which buildings are under review and what the expected timelines may be.

### **5. Notifications of Employees, Workers, and Contractors**

Part X of the COHS Regulations classifies asbestos as a hazardous substance and as such the regulations also bestow upon the employer responsibilities for control of the substance and notifications of hazards. The Canada Labour Code details specific responsibilities for the employer. Under Sect 124, the CLC requires that every employer ensure that the health and safety of every person at work is protected.

## Part 3 Asbestos Management Strategy and Plan

Employees have the right to know of hazards and under Section 125, the CLC specifically requires the employer to ensure that each employee is made aware of every known or foreseeable hazard in the workplace, and to receive employer information, instruction and training necessary to ensure their safety in the workplace. When it comes to asbestos, employees have the right to know if they are working in a facility that contains asbestos and to receive awareness training related to asbestos safety. It is the employer's responsibility to provide this through their Workplace Health and Safety Committee Network.

The CLC requirement to inform contractors of inherent asbestos hazards in buildings comes from the requirement to ensure that anyone granted access to the employer's premises is made aware of every known and foreseeable hazard. So where contractors are being used on DND properties, the contracting specifications must clearly detail all known and foreseeable hazards that the contractor may encounter, identify where those hazards are, outline what the contractor's responsibilities are for having safety and exposure plans, and what actions the contractor needs to take if they encounter asbestos without intent.

As part of the notification requirement RP Ops U(P) will provide all Formation/Wing Safety organizations and building managers with access to asbestos surveys for facilities in their area of responsibility. From there, it becomes the responsibility of the Formation/Wing Safety organizations and building managers to channel the hazard information and training down to the workers through the Workplace Health and Safety Committee networks.

### **6. Repairs and Maintenance**

Maintenance of ACM is essential to avoid potential exposures and contamination. The AMP Administrator will ensure that the Sections carry out regular inspections of the condition of all accessible ACM. Maintenance and repairs will be undertaken as soon as the deterioration or damage is identified. Prior to any work being conducted an Initial Assessment and Work Level Classification is to be completed.

Prior to any maintenance or repair work being undertaken in any facility, the responsible contract coordinator will take steps to ensure that the affected building occupants are notified of the pending asbestos work through the applicable Building Manager and/or Workplace Health and Safety Committee. A copy of the 'Notice of Asbestos Removal' form is available at Annex A, Forms. Record of this notification is to be maintained on the project file.

Once any work involving ACM is completed, the responsible contract coordinator will ensure that the 'ACM Remediation Report' is completed and forwarded to the Regional AMP Administrator. This process is required to ensure that the asbestos inventories are updated and reflect any changes to condition.

# Part 3 Asbestos Management Strategy and Plan

## **7. Initial Assessment, Containment and Work Level Classification**

Initial assessment, containment and work level classification of ACM is the responsibility of the AMP Administrator to complete or coordinate. At the discretion of the AMP Administrator, these processes can be facilitated by: contracting with a Certified Asbestos Contractor, or using in-house capability (trained Asbestos Work Coordinators).

The Initial Assessment includes but is not limited to: referencing applicable building survey information; a physical inspection of the material to confirm asbestos content and condition; conducting bulk sampling and testing where required; where asbestos is present, to complete a hazard assessment classification; to perform remedial containment procedures at the site; to set up asbestos barriers where required; and upon completion of the assessment, provide necessary details and information to the Contracting Coordinator so that a proper statement of work can be completed.

## **8. ACM Condition Reporting by Building Occupants**

If during the course of day-to-day activities, or during a Workplace Health and Safety Committee inspection, the Building Occupant notices that some ACM appears to be in deteriorating condition, they are to have their Building Manager place a trouble call with the applicable RP Ops Section. The occupants are not to attempt to conduct any local repairs.

Once an ACM trouble call is received, the applicable RP Ops Section will forward the work-order to the AMP Administrator or their local designate. The AMP Administrator or their designate will conduct an on-site assessment of the ACM, initiate any containment that is required, conduct a hazard assessment, assign a work level classification and return the work-order to Requirements for furtherance to the Contracts cell. The AMP Administrator will assist the Contract Coordinator in developing an appropriate statement of work.

After completing the assessment, and prior to leaving the site the AMP Administrator or their designate must contact the Building Manager and provide an up-date on the assessment. If the Building Manager has any concerns about restricting access to any of the work areas under their control they need to consult with either CF Health Services and/or the applicable Formation/Wing Safety Organization.

## Part 3 Asbestos Management Strategy and Plan

RP Ops will not conduct any air or clearance sampling for Level 1 or 2 work, unless the assessment dictates specific test requirements as part of the work process. If the work is classified as Level 3, a consult with CF Health Services will be required before any further action is initiated. If the Building Occupant does not agree with the assessment conducted by RP Ops and/or has health concerns, that issue is outside the scope of the RP Ops mandate. Those types of concerns must be funnelled through their Workplace Health and Safety Committee network to CF Health Services.

### **9. Training Requirements**

To ensure the effectiveness of the overall management of asbestos, it is crucial for all those who work in asbestos containing facilities, or those who may come into contact with asbestos, participate in asbestos awareness training in one form or another. The following groups need to be included in formal asbestos awareness training sessions; RP Ops U(P) Maintenance personnel and building occupants.

Content of the awareness training sessions may vary depending on the participants. Awareness training shall be presented in a manner that the participant is able to understand.

RP Ops U(P) Maintenance personnel receive specialized training to ensure their safety while working in and around building support systems that contain asbestos materials.

Training for RP Ops personnel is provided through the RP OPS U (P) Risk Management Section or Computer Based Training (CBT) on an annual basis.

The AMP Administrator is responsible for defining the training requirements and training specifications for all training related to RP Ops personnel.

Building Occupants are responsible to arrange for Asbestos Awareness Training for their staff. This type of training can be arranged through the applicable Formation/Wing Safety Organizations.

#### **.1 Specialized Training (Moderate Risk Abatement Procedures Training)**

This level of training is intended to for those workers that will work with ACM and will come into direct contact with ACM as part of their regular duties. This includes: RP Ops Trades working with and handling asbestos, Asbestos Coordination Workers (ACWs), Project Managers/Contract Coordinators responsible for coordinating projects involving ACMs; Risk Management personnel; AMP Administrator and Designates.

## Part 3 Asbestos Management Strategy and Plan

This training will certify employees to conduct initial condition assessments, conduct bulk sampling; complete a hazard assessment classification; perform remedial containment procedures at the site; to set up asbestos barriers where required; and upon completion of the assessment, provide necessary details and information to the Contracting Coordinator so that a proper statement of work can be completed.

Contractors working or engaged in projects of work in which they may encounter or are required to work with ACM's must also receive specialized training. The Department does not train contractors, but through our contracting process we must ensure that only certified Asbestos Contractors are engaged for work requiring handling of asbestos.

At a minimum the Moderate Risk Abatement training for RP Ops personnel listed above will consist of the following:

- Asbestos types, uses and applications
- Familiarization with Asbestos Management Plan and Inventories
- Health effects and medical surveillance requirements
- Legislated requirements for asbestos
- Respirator and PPE use
- Containment procedures
- Hazard Assessment Calculation
- Work level classification
- Low and Medium Risk Abatement Procedures
- Bulk sampling methods
- Clearance Testing requirements and standards
- Contractor requirements for Notice of Project, Exposure and Release Control Plans
- Decontamination and clean-up procedures
- Waste Disposal
- Hands-on practice (sampling, glove bagging)

### **.2 Asbestos Awareness Training (Building Occupants)**

At a minimum, occupants of buildings containing ACM should receive general awareness training. This is just an introduction to asbestos types, uses and applications, health hazards and general background information on the asbestos management plan. This training is to be arranged through their local Formation/Wing Safety organization. This training should be updated on a regular basis.

## Part 3 Asbestos Management Strategy and Plan

### 10. Medical Surveillance and Respirator Fit-testing

The Treasury Board Directive of Occupational Health Assessments and Health Canada's Occupational Health Assessment Guide (OHAG) outline the requirements for the medical surveillance of specific trades and work categories within the federal public service.

All employees who are required to wear respirators as part of their job responsibilities are required to complete a Health Canada Self-Evaluation Questionnaire. This form is available from RP Ops U(P) Risk Management. Once this form is completed Health Canada may dictate a medical assessment category for that employee.

Employees considered Asbestos Workers, those who must handle asbestos as part of their employment are subject to surveillance medicals. Civilian employees in this category must be referred to the RP Ops U(P) Risk Management Section to complete the appropriate forms to connect to Health Canada's medical surveillance program.

### 11. Asbestos Work Inspections and Air Monitoring

Upon completion of work involving the removal of asbestos, the work area shall be inspected by the Contract Coordinator to verify that all material has been properly removed and that the areas have been thoroughly cleaned to ensure that no debris and/or dust remain within the work area.

All type 3 abatement projects are subject to final clearance testing. Clearance testing is not a requirement for Type 1 or 2 Work. Where testing is required air monitoring will be performed within the asbestos work area following the NIOSH method 7400 – Phase Contrast Microscopy (PCM), using asbestos fibre count rules. Should PCM testing indicate results that exceed the fibre count method, then the sample should be re-tested using Transmission Electron Microscopy (TEM) to distinguish between asbestos and non-asbestos fibres. Final clearance results shall have a maximum fibre concentration of .01 fibres/cc air and meet all federal and provincial requirements.

### 12. Bulk Sampling of Asbestos

It is accepted with the industry that when conducting comprehensive baseline surveys for asbestos there will be areas of any facility or building that may not get sampled and tested: concealed spaces where the fabric of the building – walls, ceilings must be breached for access, or physical access limitations. ACM that is not physically accessible should be reported as PACM (potentially asbestos containing material), if other homogenous testing has already established the presence of asbestos. Where visual assessment may still also still be a possibility that would be considered an acceptable assessment - an example would be pipe lagging where it is clearly visible that the insulation is fibreglass and not asbestos.

## Part 3 Asbestos Management Strategy and Plan

Bulk asbestos sampling shall be conducted by, or under the supervision of a qualified person, designated by the ACM Administrator. The number of samples to be taken are represented in the following table. Bulk samples for analysis must be submitted to a Laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) in the use of the Polarized Light Microscopy Method (US EPA method EPA/600/R-93-116: Method for the Determination of Asbestos in Bulk Building Materials. The analysis of the bulk samples shall be performed at the minimum detection level of the provincial requirements of 1% minimum detection limit.

Type of Material	Size of area for homogeneous material	Min # of samples
Surfacing material, including without limitation material that is applied to surfaces by spraying, by trowelling or otherwise, such as acoustical plaster on ceilings and fire-proofing materials on structural members.	Less than 90 square metres	3
	90 square metres but less than 450 square metres	5
	450 or more square metres	7
Thermal Insulation, except as described immediately below	Any size	3
Thermal insulation patch	Less than 2 linear metres or 0.5 square metres	1
Other material	Any size	3

### 13. Labelling

In areas where ACM are identified, appropriate signage should be posted either directly on the material or at the entrance to areas in which ACM are present. The signage is to meet the regulatory requirements of the federal and provincial legislation.

ACM in building public access areas will not be directly labeled unless there is substantial potential for its damage and release of material. In these areas, labels should be placed on the material prior to encapsulation in a manner that makes the ACM obvious should the encapsulation be removed. Service areas where friable asbestos is present will be labeled at or inside the entrance and the warning labels will be placed at appropriate intervals. These labels should be highly visible and permanent.

# Part 3 Asbestos Management Strategy and Plan

## 14. Roles and Responsibilities

The roles and responsibilities with regard to the management of ACM is listed below:

- .1 Commanding Officer RP Ops U(P)
  - 1.1. Develop and implement an asbestos management plan as detailed in the DND Asbestos Management Directive;
- .2 RP Ops U(P) Risk Management Officer
  - 2.1. On behalf of the Commanding Officer, develops, implements and monitors the regional Asbestos Management Program and Plan, and acts as the Regional Asbestos Management Program Administrator;
- .3 Asbestos Management Program (AMP) Administrator
  - 3.1. Maintains the regional inventory of asbestos, assessment, re-assessment reports and ensures accessibility and availability the information to Formation/Wing Safety organizations, and Building and Property Managers.
  - 3.2. Coordinates the survey and cyclical re-inspection of all RP Ops U(P) buildings as completely as practical;
  - 3.3. Appoints and coordinates the activities of Asbestos Work Coordinators in RP Ops U(P) to assist in the implementation of the AMP;
  - 3.4. Act as the direct liaison between regulatory authorities and the ADM IE RP Ops chain of command in all matters related to asbestos management within the area of responsibility of RP Ops U(P).
  - 3.5. Ensures persons who perform work activities in proximity to ACM, or may disturb ACM, are doing so in accordance with the provisions of this Asbestos Management Plan and applicable legislation;
  - 3.6. Ensures RP Ops U(P) workers are adequately trained and instructed on an on-going basis to ensure compliance with applicable legislation;
  - 3.7. Ensure asbestos inventories are available and accessible to the RP Ops U(P) Sections and the Bases they support;
  - 3.8. Maintain records of all work related to ACMs; and
  - 3.9. Conducts periodic internal audits and performance verifications of the Asbestos Management Program, reporting findings to the Commanding Officer RP Ops U(P), and coordinating development and implementation action plans to correct any program deficiencies.
- .4 Officers Commanding RP Ops Sections (ESQ/CMX/CWK)
  - 4.1. Ensure that the requirements of the RP Ops U(P) Asbestos Management Program are fully implemented within their area of responsibility

## Part 3 Asbestos Management Strategy and Plan

### .5 RP Ops Contract Coordinators/Project Managers

- 5.1. Consult with the assigned AWC to arrange and develop scope of work, specifications and tender documents as required for asbestos related work;
- 5.2. Ensures safety requirements relating to asbestos work are included in the documents prior to going to tender;
- 5.3. Ensures that after award of contract, during completion of the ACM related work through to the close of the contract, that all contract and legislated requirements are met;
- 5.4. Where necessary obtains the required clearance documents from the contractor; and
- 5.5. Provides copy of completed work to the AMP Administrator so that the inventory can be updated.

### .6 Formation/Wing Safety Organizations

- 6.1. Ensures that Base/Wing Commanders and Commanding Officers are aware of the OHS requirements of asbestos management; and
- 6.2. Works with Building Managers to provide the required hazard notifications and awareness training to employees;

### .7 Building Managers, Occupants

- 7.1. Comply with all safety policy and directives with respect to safety and asbestos management;
- 7.2. Ensure all employees working in buildings that contain ACM receive the required notification and awareness training;
- 7.3. Include inspection of readily visible ACM as part of routine safety inspections and report any concerns related to ACM condition to RP Ops.

### .8 Personnel and Workers

- 8.1. Apply the appropriate practices, procedures and equipment for the type of asbestos-related work required;
- 8.2. Wear and/or utilize and maintain required personal protective equipment, clothing and tools; and
- 8.3. Report immediately, to the Supervisor of all known or suspected conditions or activities that may cause a hazardous occurrence.

## Part 4 Identification and Classification of Asbestos Related Work

Prior to conducting any work where there may be a possibility of disturbance of ACM the level of precautions to take prior to undertaking the activity shall be assessed. This process will be completed by a qualified, trained person appointed by the AMP Administrator, and they will be designated as an Asbestos Work Coordinator (AWC).

If friable or non-friable ACM is in an area that is not likely to be disturbed, the personnel and workers in the area will be informed of the location and type of ACM. If the ACM is likely to be disturbed by the intended work or there is a breach in containment significant enough to permit asbestos to be spread through the air, the work will be classified as either: Type 1 – minimum precautions; Type 2 moderate precautions, or Type 3 maximum precautions. The description below outlines the description of each work type.

### .1 Type 1 Work – Low Risk Work Activities

- 1.1. Removal of non-friable ACM with a hand tool;
- 1.2. Installation and/or removal or replacement of 7.5 square metres of compressed mineral fibre type ceiling tiles as long as the ceiling tiles are removed without being damaged;
- 1.3. Collecting of samples of asbestos suspect friable ACM; and
- 1.4. Working close to friable sprayed asbestos.

### .2 Type 2 Work – Moderate Risk Work Activities

- 2.1. Installation and/or removal or replacement of more than 7.5 square metres of compressed mineral fibre type ceiling tiles;
- 2.2. Entry into ceiling spaces, crawl spaces and pipe tunnels where friable ACB may be present;
- 2.3. Removal of dry wall materials where joint filling compounds may contain asbestos;
- 2.4. Minor removal of friable ACM, defined as: 1 m<sup>2</sup> of surface area, or .03 m<sup>2</sup> of debris;
- 2.5. Glove bag removals;
- 2.6. Repair of asbestos mechanical insulation.
- 2.7. Working in close proximity to but not disturbing sprayed asbestos materials; and
- 2.8. Asbestos containing floor tile removal.

## Part 4 Identification and Classification of Asbestos Related Work

### .3 Type 3 Work – High Risk Work Activities

- 3.1. More than minor removal or disturbance of friable ACM;
- 3.2. Use of power tool on non-friable ACM without HEPA exhaust dust collection;
- 3.3. Removal of boiler jacketing; and
- 3.4. Removal of asbestos pipe insulation, where the insulation cannot be removed using the glove bag procedure.
- 3.5. The spray application of an encapsulant or sealer to friable asbestos surfacing materials;
- 3.6. Disturbance of duct work and air handling equipment serving or passing through areas of buildings with sprayed asbestos fire proofing or insulation; and
- 3.7. Repair, alteration or demolition of a boiler, furnace kiln, or similar equipment with asbestos containing refractory.

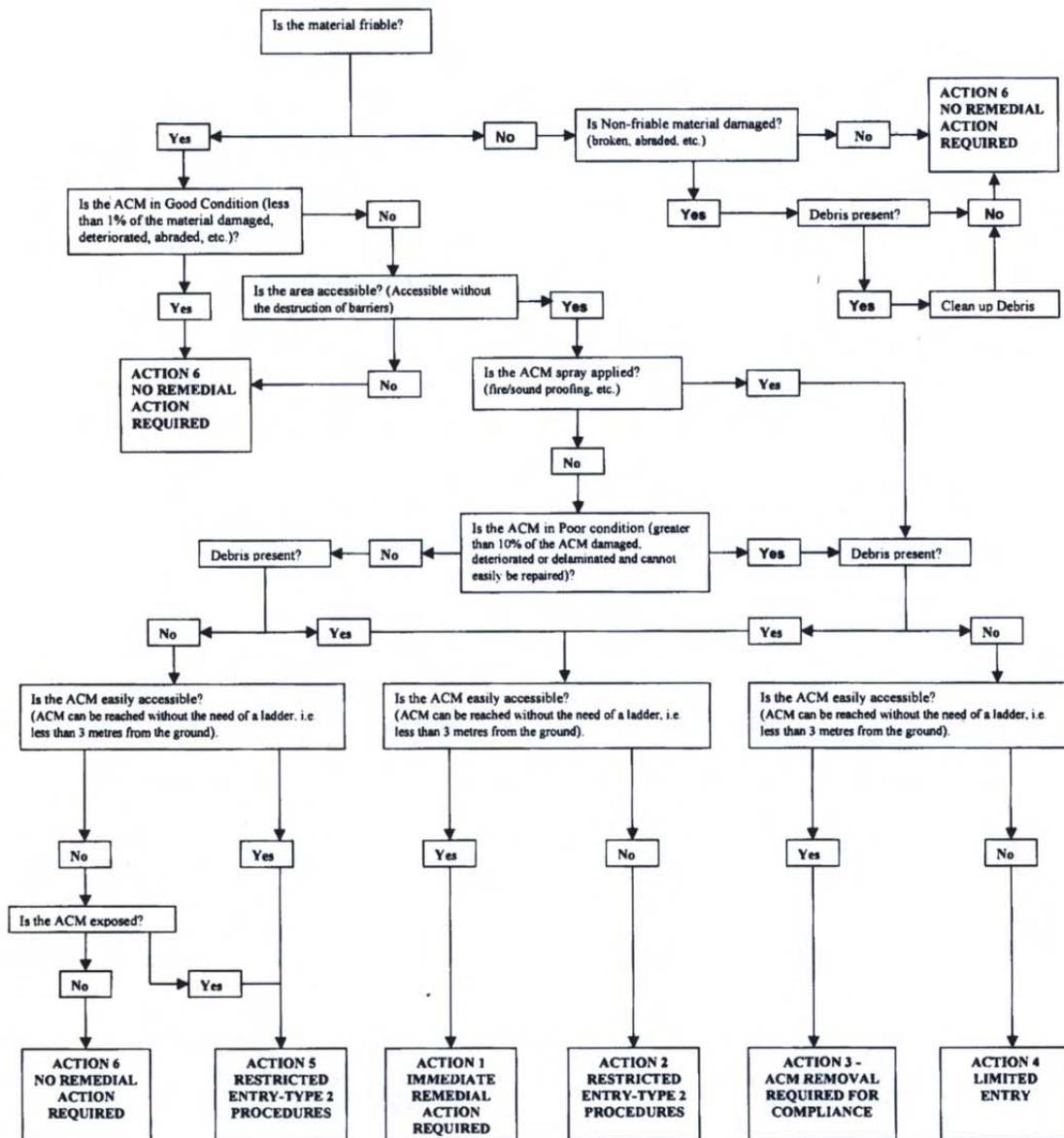
The requirements listed above are the minimum precautions or requirements for precautions taken for the type of work listed. The AMP Administrator or designated AWC may establish more stringent controls to be used for work if there is an increase in risk due to work or other related factors.

Once the ACM has been assessed and classified, the AWC will initiate containment and establish any barricades as required, perform a hazard assessment scoring, and report the conditions to the AMP Administrator for approval, and the Contract Coordinator responsible for the completion of the work. The AWC may be required to assist the Contract Coordination in developing the statement of work.

After completing the required assessment, containment and classification the AWC will provide a status report to the Building Manager prior to leaving the site.

# Part 4 Identification and Classification of Asbestos Related Work

## ASBESTOS CONDITION ASSESSMENT AND RESPONSE CHART



- ACTION 1 – Restrict access to the area and clean up the ACM debris using appropriate asbestos procedures.
  - ACTION 2 – Restricted Entry into areas that contain, or may contain ACM Debris. All entry into the area will require at a minimum Type 2 procedures until the ACM debris have been cleaned up, and the source of the debris have been stabilized or removed.
  - ACTION 3 – Asbestos removal required for compliance. Develop scope of work and utilize appropriate removal procedures.
  - ACTION 4 – Limited Entry: personnel who enter into these areas have to be aware of the presence of the type and location of the ACM. If any entry into the area may cause a disturbance of the ACM, Type 2 procedures must be used for entry until the ACM is removed.
  - ACTION 5 – ACM may be repaired if the ACM is considered to be in Fair Condition (less than 10% damaged), and it is unlikely for the material to be damaged, or disturbed again. Once the ACM has been repaired it may be treated as in GOOD condition (less than 1% damaged).
  - ACTION 6 – No remedial action is required. The materials are to be managed in accordance with the Asbestos Management Directive.
- NOTE: Pro Active Removal may be a part of an Asbestos Management plan or for removal of ACM that are in locations that may not be desirable regardless of the materials condition.

## Part 5 Hazard Assessment

Asbestos containing materials must be assessed for a variety of factors to evaluate their potential for fibre release. The hazard assessment methodology employed by RP Ops U(P) follows the guidelines established by the WorkSafeBC Occupational Health and Safety Regulations.

### 1. Hazard Assessment Criteria

RP Ops U(P) hazard assessment addresses five different criteria when evaluating asbestos containing materials, as detailed below.

- .1 Friability of Material
- .2 Condition of Material
- .3 Accessibility of Material
- .4 Frequency of Access to Material
- .5 Potential for Disturbance of Material

Each category will have an assigned rating score based on the level of hazard. The total score will subsequently dictate the appropriate method of dealing with the ACM.

### 2. Rating and Point Scoring

Each criteria category will have three main sub-categories, generally detailed as Low, Moderate and High. Each sub-category will be assigned a relative point score where 1 equals the lowest potential for risk, 3 equals the median potential for risk and 5 equals the highest potential for risk. Additionally, intermediate point scores are provided to assist the Asbestos Work Coordinator in better categorizing the risk potential in circumstances where the risk factor is not adequately reflected within one of the three main sub-categories. See “Action Levels” for details on point totals and corresponding actions.

<b>Risk Quantification</b>	<b>Hazard Rating</b>
Low risk	1 point
Low to Moderate risk	2 points (intermediate rating)
Moderate risk	3 points
Moderate to High risk	4 points (intermediate rating)
High risk	5 points

## Part 5 Hazard Assessment

### 3. Categorization of Material

Asbestos containing materials are categorized in accordance with standards as detailed herein;

#### Surfacing Materials

ACM sprayed or trowelled on surfaces (walls, ceilings, and structural members) for acoustical, decorative or fireproofing purposes.

#### Thermal System Insulation

Insulation used to inhibit heat transfer or prevent/limit condensation on pipes, boilers, tanks, ducts and various other components of hot and cold water systems and HVAC systems.

#### Miscellaneous Materials

Other non-friable products and materials

Based on previous surveys of RP Ops U(P) buildings, the following products have been identified as asbestos containing and recorded into their appropriate category.

Surfacing Materials (SM)		Thermal System Insulation (TSI)		Miscellaneous (MIS)	
	Product		Product		Product
	Drywall Joint Compound		Mechanical Pipe Elbow Mud		Ceiling Tile Glue
	12"x12" Vinyl Asbestos Floor Tile				2' x 4' Ceiling Tile
	9"x9" Vinyl Asbestos Floor Tile				Sill Plate Gasket
	Sheet Flooring				Window Putty
	Ceiling Material (Panel)				Roofing Tar

### 4. Friability of Material

Friability is the measure of the potential for release of fibres, either from the inherent properties of the product or by external stimuli, and is defined as;

“Material that, when dry, can easily be crumbled or powdered by hand pressure. It also means material that is already crumbled and powdered.” Note: Friability must not be assessed by attempting to crumble or powder by hand unless all appropriate precautions are taken to minimize exposure to airborne asbestos fibres and to avoid contaminating the area.



## Part 5 Hazard Assessment

Low	Low to Moderate	Moderate	Moderate to High	High
Hazard Rating = 1	Hazard Rating = 2	Hazard Rating = 3	Hazard Rating = 4	Hazard Rating = 5
Vinyl tile	Transite, Cement wallboard	Texture paints	Soft pipe elbows	Applied firespray
HVAC duct mastics	Floor levelling compounds	Drywall joint compounds	Cementitious compounds	Texture Coating
	Electrical sheathing	Pipe and/or other gaskets	Aircell	Hard pipe elbows
Caulking, putty	Fire curtains	Ductwork flexible fabric connection	Boiler jacketing	
Roof mastic	linoleum	Roofing felts		
Fire doors	Cement pipe			

### 5. Condition of Material

Material will nominally be categorized as indicated below, with the corresponding hazard rating.

Good	Damaged	Significantly Damaged
Hazard Rating = 1	Hazard Rating = 3	Hazard Rating = 5
Material with no visible damage or deterioration, or showing only very limited damage or deterioration,	<p>Surface crumbling, blistered, water-stained, gouged, marred or otherwise abraded over less than one tenth of the surface if the damage is evenly distributed (one quarter if the damage is localized)</p> <p>Accumulation of powder, dust, debris similar in appearance to the suspect material on surfaces beneath the material.</p>	<p>The surface crumbling or blistered over at least one tenth of the surface if the damage is evenly distributed (one quarter if the damage is localized)</p> <p>One tenth (one quarter if localized) of material hanging from the surface, deteriorated or showing abrasive failure,</p> <p>Water stains, gouges or mars over at least one tenth of the surface if damage equally distributed, (one quarter if damage is localized)</p>

## Part 5 Hazard Assessment

If the material is classified as damaged or significantly damaged, the Asbestos Work Coordinator shall evaluate whether the damage is localized to the extent that remediation of damaged or significantly damaged area can be undertaken, or whether the entire material requires abatement. The AWC shall take pictures of the damaged materials and record comments on the Hazard Assessment form, indicating the extent of damage to the material.

### .1 Homogeneous Sampling Group [HSG]

Homogeneous Sampling Groups are areas that contain material that is uniform in texture, colour, date of application or installation, and appears identical in every other aspect. The AWC shall consider whether the materials represent one HSG, or can it be divided into several HSG. By example, pipe lagging may be homogeneous throughout all pipes within the area, however piping systems may be divided into groups with abatement performed on those groups requiring remediation. The AWC may divide material into several HSG and assign the appropriate rating to each group.

Dividing the survey area into different homogenous sampling groups may prove beneficial if conditions warrant the abatement of some but not all of the ACM's within the survey area.



### .2 Heterogeneous Sampling Group [HeSG]

If the survey area cannot be classified into one or several Homogeneous Sampling Groups, the Asbestos Work Coordinator shall classify the area a Heterogeneous Sampling Group, defined as; “a sampling area that is diverse in nature, consisting of material/product of different texture, colour or date of application or installation, or appears to be different in some aspect”.

Under these circumstances the AWC must assess the area in its entirety, assigning a point rating based on the worst conditions found within the HeSG.

## Part 5 Hazard Assessment

### 6. Accessibility of Material

Accessibility determines the likelihood for potential disturbance or damage resultant from contact by non-abatement personnel. At the Asbestos Work Coordinators' discretion, intermediate hazard ratings may be used to further characterize the accessibility of the material.

Low potential to access	Moderate potential to access	High potential to access
<p><b>Hazard rating = 1</b></p> <p>Are not within the reach of building occupants without scaffolding or elevating devices,</p> <p>Are encapsulated such that destructive methods are required to access material,</p> <p>Are in areas where access is strictly controlled or restricted?</p>	<p><b>Hazard rating = 3</b></p> <p>Are within reach of building occupants by stepladder,</p> <p>Are enclosed behind T-bar ceilings,</p> <p>Are in areas where access is somewhat controlled or restricted?</p>	<p><b>Hazard rating = 5</b></p> <p>Are within arms' reach of building occupants,</p> <p>Are not behind any enclosure,</p> <p>Are in areas that are accessed without control or restriction.</p>

Intermediate ratings for potential to access may include, but are not limited to:

Low to Moderate potential for access	Moderate to High potential for access
<p><b>Hazard Rating = 2</b></p> <p>Can be proximally accessed, i.e.; access to area granted through with restrictions prohibiting contact with known ACM's in area, in cases where work is not expected to disturb ACM's.</p>	<p><b>Hazard Rating = 4</b></p> <p>Can be proximally accessed, i.e.; access granted to building support area through Request for Lock Out where worker is in proximity to ACM in cases where work is not expected to disturb ACM's,</p>

The Asbestos Work Coordinator shall consider the likelihood that building occupants working in proximity to the material will access the material. Although material may be within reach of building occupants by stepladder, further evaluation considers the likelihood that tenants would access this material. The AWC may grant a lower point rating for material that is not considered to be accessed due to the activities that are normally undertaken within the area.

The AWC shall consider other activities that could occur in proximity to material. Areas where work activity may require building occupants to use elevating devices, stepladders or fixed ladders should be given a higher rating than areas where no access is perceived to occur.

## Part 5 Hazard Assessment

### 7. Frequency of Access to Material

When evaluating for Frequency of Access, the Asbestos Work Coordinator shall consider the type of access that is occurring. By example, public areas with ACM texture coat ceilings are frequently transited by workers and the public, however this degree of access does not increase the risk of contact with the material. In such cases the AWC may assign a lower hazard rating than detailed below.

Conversely, areas where building support personnel, construction personnel or worker personnel are accessing in proximity to material should be assigned a higher hazard rating based on the potential for contact in relation to the frequency of access.

<b>Low Frequency of Access</b>	<b>Moderate Frequency of Access</b>	<b>High Frequency of Access</b>
<b>Hazard Rating = 1</b> Building support personnel and/or construction contractors are in the vicinity of material less than once per month.	<b>Hazard Rating = 3</b> Building support personnel and/or construction contractors are in the vicinity of material at least once a month, but not more than once a week.	<b>Hazard Rating = 5</b> Building support personnel and/or construction contractors are in the vicinity of material more than once per week.

## Part 5 Hazard Assessment

### 8. Potential for Disturbance of Material

The potential for materials to be disturbed takes into consideration the following factors which include, but are not limited to; the influence of vibration, the potential for water damage, the potential for air erosion, the potential for impact or abrasion to material,

Low disturbance potential	Moderate disturbance potential	High disturbance potential
Hazard Rating = 1	Hazard Rating = 3	Hazard Rating = 5
<p>Vibration Infrequent vibration of low intensity</p> <p>Infrequent loud noise</p> <p>Water Damage: Little or no potential to be exposed to water</p> <p>Air Erosion: Little or no potential for exposure to air movement beyond normal HVAC systems, excluding areas where primary systems are operating,</p> <p>Impact or Abrasion: Low potential for direct impact; i.e.; encapsulated behind solid material, inaccessible</p>	<p>Vibration Equipment or processes that create periodic vibrations of a moderate intensity, i.e.; HVAC ducting, water through pipes,</p> <p>Periodic loud noise</p> <p>Water Damage: Moderate potential for water damage, i.e.; pipe elbows, waterline wrap, roofing felts, and, Material proximal to high pressure water mains, boilers,</p> <p>Air Erosion: Moderate potential for exposure to air movement beyond normal HVAC systems, i.e.; primary HVAC systems and ducts, periodic exposure to outdoor air,</p> <p>Impact or Abrasion: Moderate potential for direct impact, i.e.; material covered by low durability surfacing, i.e. paint, area where limited space may increase potential for disturbance</p>	<p>Vibration Heavy equipment and/or processes creating vibration of a significant intensity, harmonic wave or oscillation factor, i.e.; diesel back-up generators, HVAC primary systems,</p> <p>Ongoing loud noise</p> <p>Water Damage: Direct exposure to outdoors where material comes into frequent contact with water, i.e.; roofing materials, exterior claddings, and, where material could be significantly disturbed from break in high pressure water systems, i.e.; boilers, water mains,</p> <p>Air Erosion: High potential for exposure to significant air movement, i.e.; exterior areas, air plenums,</p> <p>Impact or Abrasion: High potential for direct impact, i.e.; ongoing worker activity in area, areas where limited space significantly increases likelihood of contact, near moving equipment</p>

## Part 5 Hazard Assessment

At the discretion of the Asbestos Work Coordinator, taking into consideration field observations and/or historical data, intermediate points may be awarded.

Considerations for intermediate points may include, but are not limited to;

- .6 Whether the area(s) containing the material is accessed by RP Ops U(P) personnel only, or whether non- RP Ops U(P) personnel are accessing the area(s);
- .7 Whether the material shows signs of previous damage attributed to an activity or condition still present in the area;
- .8 Whether the material shows no sign of damage although in an area categorized as high potential for disturbance; and,
- .9 Whether water/air damage is consistent throughout the entire material or limited to one portion.

Additionally, the Asbestos Work Coordinator may observe or identify other factors that create the potential for disturbance of the material. The AWC shall detail these factors on the Hazard Assessment form and assign a hazard rating and associated point score.

## Part 5 Hazard Assessment

### 9. Point Totals

Asbestos containing materials will be prioritized on the eight criteria fields established above, and shall be assigned a relative point score in each of the criteria fields. The lowest score attainable will be eight [8], based on one point [lowest risk rating] awarded in each field. The maximum attainable score will be forty [40], based on 5 points [highest risk rating] awarded in each field.

The potential for uncontrolled fibre release will be rated as high, moderate or low and will be used to prioritize any required remedial action(s). Although numerical rating serves as a basis for assessing the hazard of ACM, professional judgement must be used to prioritize any remedial work.

The following table indicates the corresponding Action Level based on the point scoring system.

<b>Total</b>	<b>Likelihood of Fibre Release and Worker Exposure</b>	<b>Priority Level</b>	<b>Action</b>
18 to 27	High	Immediate Priority [IP]	Immediate action required
13 to 17	Moderate	Strategic Abatement [SA]	Regular monitoring required. Schedule for upcoming capital allocation.
5 to 12	Low	Manage in Place [MP]	Inspect and monitor. Re-evaluate during scheduled inspections.

## Part 6 Abatement Procedures

This section details the procedures to be used for all abatement work undertaken on behalf of RP Ops Unit (P). The procedures described herein are designed to meet or exceed regulatory requirements for abatement of asbestos and are consistent with the best practices of industry.

RP Ops Unit (P) shall only use qualified, professional asbestos abatement contractors for abatement work. Abatement contractors must attain safety pre-qualified status prior to consideration, tender or award of RP Ops Unit (P) projects.

To maintain the safety of persons and property, all work that could potentially disturb or remove asbestos containing materials must first be approved by the AMP Administrator. See Section 3, Facility Renovation, for further details on initiating construction and/or renovation work in asbestos containing areas.

Prior to authorizing any such work, the AMP Administrator shall prepare and implement detailed written instructions specifying all precautions required by applicable legislation. Where the work involves the services of more than one contractor, the Contract Coordinator shall ensure a Prime Contractor for the work is assigned, who in turn shall be responsible to prepare and implement written instructions for co-ordination of the activities of all sub-contractors.

Asbestos abatement work procedures shall be specific to each project and/or work area. The work procedures shall include establishment of the containment enclosure, abatement procedures, monitoring, respiratory protection, personal protective equipment and clothing, signage, and disposal of asbestos containing waste.

### 1. General Requirements

The abatement contractor shall be required to meet the following general requirements for all medium and high risk abatement projects;

- .1 Prior to initiating medium or high risk work, complete and submit a Notice Of Project - Asbestos [NOPA] to the WorkSafeBC;
- .2 Submit copy of the NOPA to the AMP Administrator along with specific abatement procedures. The AMP Administrator must approve the procedures prior to authorizing the work to proceed;
- .3 Ensure perimeter barriers are effectively sealed and taped. Any defective or damaged barriers must be immediately replaced;
- .4 Inspect the interior and exterior of the enclosure at the beginning and end of each work shift, or more frequently as necessary to ensure the integrity of the enclosure;
- .5 Use smoke tubes to test effectiveness of barriers and negative air system;

## Part 6 Abatement Procedures

- .6 Negative air units meet WorkSafeBC requirements for DOP testing and adequate air exchange;
- .7 Regularly inspect negative air units to ensure filters are not clogged;
- .8 Respiratory protection equipment meets applicable WorkSafeBC Occupational Health & Safety Regulation;
- .9 All personnel who are anticipated to disturb asbestos containing materials are issued a respirator;
- .10 Respiratory protection training and fit testing is provided to all personnel entering the abatement area;
- .11 Training and fit test records are retained at the site and made available to AMP Administrator and/or WorkSafeBC as requested;
- .12 A qualified Supervisor is at the work site during all work periods so as to ensure that work procedures are properly executed;
- .13 Supervisor(s) are knowledgeable and qualified in all aspects of abatement work;
- .14 Supervisors provide instruction to workers on;
  - the hazards of asbestos exposure,
  - the use and fitting of respirators and protective clothing,
  - proper showering out procedures,
  - access and egress to the work area, and,
  - emergency procedures
- .15 Provide to workers;
  - protective full body clothing complete with head covers, elastic cuffs and feet, rubber boots or other easily decontaminated footwear,
- .16 Contaminated footwear and equipment is left in the contaminated area until the end of the abatement work, at which time it is disposed of as asbestos waste, or is thoroughly cleaned of all asbestos or asbestos containing materials;
- .17 Contaminated footwear is not be worn outside the work area;
- .18 Controlled products used and/or stored on the site are properly labelled and Material Safety Data Sheets [MSDS] are available to all workers;
- .19 Employees required to use controlled products are knowledgeable with regard to; the registered names of the materials, the hazardous nature of the materials, the required personal protective equipment, and, where the MSDS are kept.

## Part 6 Abatement Procedures

- .20 Warning signs at appropriate locations have been posted around the work area as required;
- .21 Vacuums are equipped with effective DOP tested HEPA filtering systems;
- .22 Arrangements for disposal of asbestos containing waste materials are in place prior to commencement of abatement;
- .23 That high risk abatement work has a pre-contamination inspection completed prior to start of abatement. The AMP Administrator will designate the person to perform said inspection;
- .24 Should a room be used as the high risk containment enclosure, all openings, penetrations, or cracks in the walls, ceilings or floors must be sealed with 6mm polyethylene, 2" wide duct tape and spray glue as necessary;
- .25 Electrical panels are locked out and de-energized. If operational constraints prevent lock out of electrical panels, cover and seal with two layers of 6 mil polyethylene sheeting and duct tape, and install warning signage;
- .26 HEPA filter negative air exhaust is vented to the exterior of the building, ensuring that recirculation and/or re-entrainment is not possible;
- .27 Materials and equipment are properly stored in dry, heated and ventilated areas that provide protection from damage, contamination and exposure to the elements;
- .28 Materials and equipment are used in accordance with manufacturer's recommendations;
- .29 Damaged or deteriorating materials are not to be used; and,
- .30 Contaminated material is properly decontaminated or disposed of as contaminated debris.

## Part 6 Abatement Procedures

### 2. Low Level Abatement Work Procedures

#### .1 Worker Protection

Protective equipment and clothing to be worn by workers while in the asbestos work area are: non-powered re-usable or replaceable filter type respirator with HEPA cartridges, and disposable type protective clothing consisting of full body covering including head, with snug fitting cuffs at wrist, ankles and neck.

#### .2 Procedures Prior to Cleanup

Isolate asbestos work area using, where required, pre-printed cautionary asbestos warning signs and barrier tape. Remove visible dust from the work area where dust is likely to be disturbed during the course of work. Use HEPA vacuum, or damp cloths. Do not use compressed air to clean-up or remove any dust from any surface.

Prevent the spread of dust from the asbestos work area using measure appropriate to the level of work being done. Use drop poly drop sheets over flooring such as carpeting that absorbs dust, and over all flooring where dust cannot be safely contained.

Wet materials to be cut, ground, abraded, scraped, drilled. Use garden type low-velocity type fine mist sprayer. Perform work in such a manner as to keep dust levels to the lowest possible levels practicable.

#### .3 After clean-up

Frequently HEPA vacuum or damp mop asbestos-containing waste during the work and immediately after completion of the work. Place asbestos containing waste, including vacuum dust bag into dust tight waste bags and seal tightly. Treat drop sheets and disposable clothing as asbestos waste. Clean the exterior of each bag with HEPA vacuum or damp cloths and place in second clean waste bag immediately prior to leaving waste area.

Seal waste bags and remove from the site. Dispose of in accordance with provincial waste disposal procedures.

## Part 6 Abatement Procedures

### 3. Medium Risk Work Procedures

Although specific requirements may vary for each abatement, the following general procedures apply and shall be required when abatement work is classified as medium risk.

- .1 Establish an enclosure around the work area. Unless otherwise specified by the AMP Administrator, all medium risk enclosures shall be delineated by Asbestos barrier tape;
- .2 At the discretion of the AMP Administrator, plywood hoarding or poly barriers may be specified for the perimeter of the work area to protect against accidental damage caused by persons and/or equipment in adjacent operational areas;
- .3 Place signs around the perimeter of the work area indicating that asbestos work is in progress and that entry into the designated work area is permitted only to authorized persons who are adequately protected against the hazards within that work area;
- .4 At the discretion of the AMP Administrator, signage may be removed from perimeter plywood hoarding adjacent to operational areas. Under these circumstances the AMP Administrator will stipulate an entry vestibule into a staging area where workers can don personal protective equipment prior to entering the abatement area. Signage shall be placed inside this vestibule area to notify persons not to enter the abatement area;
- .5 Put a drop sheet consisting of at minimum 6mm polyethylene sheeting below the material to be removed;
- .6 If the work area cannot be effectively isolated, a 6-mil polyethylene plastic enclosure should be built. The enclosure must have overlapping flaps at the entrance to allow the area to be sealed once workers have entered;
- .7 Turn off and isolate the HVAC supply and exhaust to the area;
- .8 Ventilate the enclosed area if necessary by drawing air from the room through a HEPA equipped negative air unit;
- .9 All persons entering the abatement work area must wear Tyvek or equivalent disposable coveralls;
- .10 All persons in the abatement area must wear respiratory protection adequate for the anticipated level of exposure;
- .11 Protective coveralls used within the enclosure may not be worn outside the perimeter containment;
- .12 Contaminated protective coveralls must be disposed of as contaminated waste; and,
- .13 Eating, drinking, and smoking are not permitted inside perimeter containment.

# Part 3 Asbestos Management Strategy and Plan

## 4. Glove Bag Removal

Although specific requirements may vary for each type of abatement, the following general procedures shall be required for glove bag removal;

- .1 Isolate the work area as necessary to prevent observation of abatement work by building occupants and/or the public, following containment protocols stipulated in medium risk work procedures;
- .2 Put a drop sheet consisting of at minimum 6mm polyethylene sheeting below the material to be removed;
- .3 Place required tools in glove bag;
- .4 Attach glove bags to area using adjustable nylon straps, tie straps, and/or duct tape. Note: Glove bags shall not be sealed directly to pipe(s) where the external temperature of the pipe exceeds 70 degrees Celsius;
- .5 Insert HEPA filtered vacuum cleaner hose in vacuum port of glove bag and seal with tape;
- .6 Insert water spray wand through water inlet port of glove bag and thoroughly wet down insulation material;
- .7 After ensuring the bag is ready for use, perform a leak test. Remove the sprayer wand from the bag, insert a smoke tube in its place and fill the bag with smoke. Squeeze the bag and verify whether smoke is contained within the bag. Momentarily turn on the vacuum cleaner to extract the smoke;
- .8 Place hands in glove of glove bag. Carefully remove insulation and place at bottom of glove bag, ensuring all materials are removed by scraping or brushing as required;
- .9 Insert sealant spray wand through water inlet port of glove bag and apply a liberal coating of sealant to the bare pipe, ends of insulation on pipe, inside surfaces of glove bag tools and removed materials;
- .10 Close up bag. Grasp tools and withdraw arm from glove bag – turning armlet inside out, the tools now being inside the inverted glove;
- .11 Twist the removed armlet and attach two tie straps approximately two inches apart to seal off the glove bag and the glove containing the tools and cut through the armlet between the two tie straps; Place the severed end of the sleeve inside the next glove bag to be used; turn on the vacuum cleaner and allow vacuum to collapse the bag, secure neck with a tie strap.
- .12 Place 6mm labelled disposal bag over the glove bag, pulling it up from below. While supporting the bag, remove the straps securing the glove bag to the pipe and carefully lower both bags; fold the top of the glove bag to close and secure it with a tie strap and hold the glove bag down inside the outer bag. Fold the neck of the outer bag and secure closed with a tie strap. Set bag aside for subsequent disposal;

## Part 3 Asbestos Management Strategy and Plan

- .13 Inspect the pipe to ensure that all insulation has been removed. Remove any residual pieces or dust using a HEPA filtered vacuum or wet cloths, disposing of used cloths as contaminated waste;
- .14 Vacuum any debris from the drop sheet and spray mist with sealant. Fold it up and place it inside a 6mm disposal bag; and,
- .15 All waste materials are to be double bagged and disposed of in a licensed landfill as soon as possible. Waste materials are not to be left at the work site unattended.

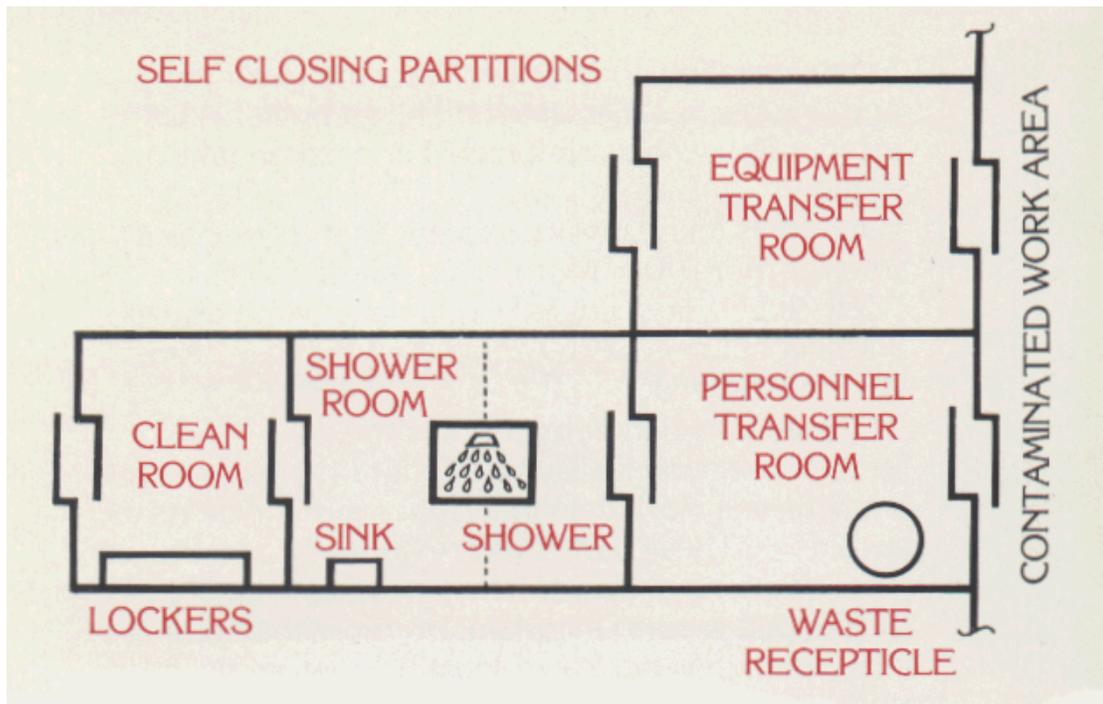
### 5. High Risk Asbestos Work Containment Procedures

#### .1 Enclosure Systems

The decontamination enclosure system shall; consist of a clean room, shower room and an equipment room; be constructed with 2X4 studs at 16 inches on centre, unless otherwise specified; be sheathed with 5/8" D-grade plywood for non-occupied areas, and 5/8" GIS [Good One Side] plywood for occupied areas, unless otherwise specified in contract documents; use GIS plywood must have the good side facing the occupied area. Paint plywood white and use 2" white duct tape to seal all joints; and the Interior lined with 6 mm polyethylene and sealed with tape at all lap joints.

All Type 3 abatement projects are subject to final clearance testing. Air monitoring will be performed within the asbestos work area following NIOSH method 7400 – Phase Contrast Microscopy (PCM), using the asbestos fibre counting rules. Final clearance results shall have a maximum fibre concentration of .01 f/cc of air and meet all applicable federal and provincial regulations. Should PCM testing indicate results that exceed the fibre count method, then the sample should be re-tested using Transmission Electron Microscopy (TEM) to distinguish between asbestos and non-asbestos fibres.

## Part 6 Abatement Procedures



**Sample Layout for High Risk Enclosure System**

### .2 **Clean Room**

Construct the clean room at least 6ft long, with one double curtained doorway leading into the shower and one entrance or exit to a non-contaminated area. The entrance/exit door shall be provided with a lock for security as necessary, with copies of the key provided to Contract Coordinator as requested;

### .3 **Shower Room**

Construct the shower room at least 6 feet long, with two double curtained doorways, one leading to the equipment room and one to the clean room. The shower room shall contain a shower with hot and cold running water. Wastewater must be filtered through a five-micron filter system prior to releasing into sanitary system;

### .4 **Equipment Room**

Construct the equipment room at least 6 feet long, with two double curtained doorways, one leading to the work area and the other leading to the shower room;

## Part 6 Abatement Procedures

### .5 Waste Transfer Room

Construct the waste transfer room with an air lock and two curtained doorways, one leading to the work area, the other leading to the holding area;

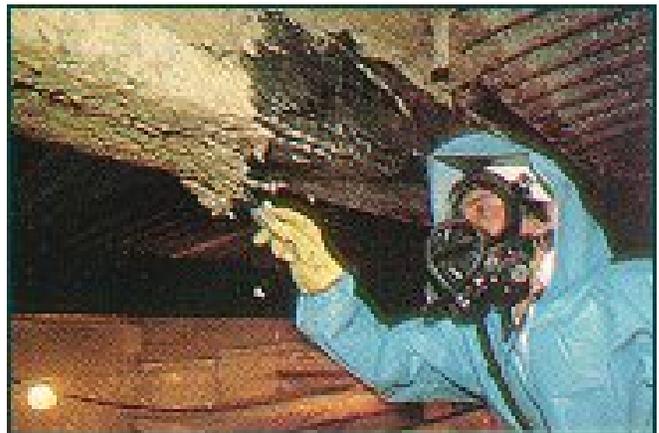
### .6 Holding Area

Where required, a holding area will be constructed to retain waste material prior to final removal from site. The holding area shall be enclosed with two curtained doorways, one leading to the waste transfer room and one leading to the exterior. Place signage on exterior door to prevent unauthorized access;

## 6. High Risk Abatement Procedures

Prior to removing any asbestos, the material must be sprayed and saturated with amended water using airless spray equipment capable of producing a “mist” to control the release of fibres as the work progresses;

- .1 The material must be saturated sufficiently to wet it to the substrate without causing excess dripping or delamination. As necessary, allow sufficient time for two wettings prior to the commencement of stripping to ensure that the insulation has been saturated and wetted to the substrate;
- .2 The material must be sprayed repeatedly during the removal process to maintain the wet condition;
- .3 The saturated material shall be removed in small sections and placed into sealable 6 mm polyethylene bags;
- .4 Material shall not be allowed to dry out or accumulate on the floor of the work area;
- .5 The bags shall be sealed, cleaned of gross contamination, and transferred to the bag room;
- .6 The bags shall be cleaned and placed in the second clean 6 -mil polyethylene bag, which will also be wet cleaned;
- .7 The bags are then transferred to the holding area pending removal to the uncontaminated area and placed in a container to transfer to the disposal site;
- .8 When stripping has been completed, all surfaces from which asbestos has been removed shall be cleaned to remove all visible material;



## Part 6 Abatement Procedures

- .9 Surfaces being cleaned shall be kept wet during this work. No residue shall remain which when dry could release fibres into the air;
- .10 When cleaning is complete and all visible asbestos has been removed from the work surfaces, the contractor shall call for inspection by the AMP Administrator or his designate;
- .11 The Administrator or his designate shall inspect the work area and provide visual clearance, or stipulate additional cleaning requirements;
- .12 Should additional cleaning be required, the contractor must call for another inspection once the remedial work is complete; and,
- .13 Following visual clearance, the contractor shall proceed with application of an approved asbestos sealer to all exposed surfaces, including polyethylene barriers and the space of the work room.

### 7. High Risk Clean Up/Tear Down Procedures

After the sealer has been applied and allowed to dry, air sampling will be supervised by the appointed Asbestos Work Coordinator, or appointed designate. **Note:** The negative air system may not be shut down during air sampling. Final acceptance and approval of the work will require that;

- .1 No visible signs of contaminated materials are evident;
- .2 Air sample analysis confirms that fibre levels are no greater than 0.01 fibres/cc. See Air Clearance in this section for details;
- .3 Approved asbestos testing consultant provides a written report of the air sample results. Should the levels exceed 0.01 f/cc, additional remedial actions shall be required as stipulated by RO Ops U(P) or approved asbestos consultant with no additional cost to RO Ops U(P);
- .4 Once the contractor has received the written report confirming air sample results at or below 0.01 f/cc, the contractor may proceed with tear down of the containment;
- .5 All work areas, decontamination systems, etc, shall be included in the tear down; and,
- .6 All used polyethylene, contaminated materials, clothing etc, shall be bagged, sealed and transferred to the waste disposal site.

## Part 7 Asbestos Releases

In the event the personnel, workers, or other persons observe debris or cause an accidental disturbance of ACM, the debris is to be cleaned up and removed, and the damage material must be repaired or removed as soon as possible. All such releases are to be reported to the applicable RP Ops U(P) Section Trouble Desk.

The nature of the disturbance and the area to be cleaned and decontaminated will determine whether the work will be conducted by appropriately trained personnel for Minor Release Episodes or by outside certified abatement contractors for Major Release Episodes.

Every minor or major fibre release episode must be documented and the report should include the building, room and/or description where the event occurred, a description of what caused the incident, and a detailed account of the response. This is to be reported on the DND663 Hazardous Occurrence Report.

Once the disturbance is reported to RP Ops, the AMP Administrator will designate an Asbestos Work Coordinator to conduct the assessment and containment. The work is to be designated as Type 1, Type 2, or Type 3 and the pertinent information is to be provided by the AWC to the Contract Coordinator to initiate the required work.

### 1. Minor Release Episodes

In response to a small amount (less than 0.03 sq metres – ½ the size of 8.5 x 11 sheet of paper) of material accidentally dislodged, disturbed or broken in an area is to be cleaned up using appropriate wet cleaning or HEPA vacuum technique. The following procedures shall be followed:

The area that is immediately impacted shall be isolated and personnel or workers must wear appropriate respiratory protection;

The debris must be saturated with a fine mist sprayer, collected and placed in a double 6 mil plastic bag, properly labelled for disposal. Alternatively the material can be collected in a HEPA vacuum cleaner.

# Part 7 Asbestos Releases

## 2. MAJOR Release Episodes

In response to a release larger than .03 square metres ( larger than a standard sheet of paper), the material is to be cleaned up by staff or contractors that are trained to deal with asbestos. Maximum precautions must be followed and will be implemented in accordance with the Type of work to be completed. The procedures that must be followed are:

- .1 Isolating the area as soon as possible after the ACM is discovered, or disturbed;
- .2 Posting warning signs to prevent unauthorized entry into the area;
- .3 Set up containment zone and decontamination areas if and as required;
- .4 Wearing appropriate PPE for all authorized workers;
- .5 Shutting of air handling system temporarily;
- .6 Sealing doors, windows, and registers in the contaminated area;
- .7 Spraying fallen debris with water and double bagging the waste, labelling the bag and properly disposing of the waste;
- .8 Assess type of damage and remove using Type 3 methods, if necessary.(All Type 3 work is to be contracted out to trained and certified asbestos abatement contractors.)

## Part 7 Asbestos Releases

### 3. Air Monitoring & Air Clearance

Throughout the course of high risk abatement work, RP Ops U(P) or approved asbestos consultant shall collect the following air samples;

- .1 Daily ambient sampling around the exterior perimeter of the work area. The number of samples collected will be a function of the size of the containment;
- .2 Daily inside the clean room. One sample will be collected during each work shift; and,
- .3 Occupational sampling inside the work area. One sample will be collected per work shift until the sampling demonstrates the effectiveness of the work procedure. Subsequent occupational sampling may occur at the discretion of AMP Administrator or the approved asbestos consultant;
- .4 Samples for analysis must be submitted to a Laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) in the use of the Polarized Light Microscopy Method (US EPA method EPA/600/R-93-116: Method for the Determination of Asbestos in Bulk Building Materials.
- .5 Air sample results must be available within 24 hours of sample collection, or at the start of the next similar shift period. Copies of all air monitoring reports shall be provided to the abatement contractor for posting at the worksite; and,
- .6 Review the lab results to determine if they are within regulated permissible fibre concentrations. The 8-hour limit permissible fibre concentration is 0.1 fibres/ml. Clean Room and Ambient samples must be below <0.1 fibres/ml. Air Clearance sample fibre concentration is <0.01 fibres/ml. Occupational samples must meet respiratory requirement criteria as shown in Table 3.

# Part 7 Asbestos Releases

## 4. Air Sampling Action Levels

Should the following action levels be reached or exceeded, the RP Ops U(P) AMP Administrator or approved asbestos consultant shall instruct the abatement contractor to undertake all remedial actions necessary to lower fibre counts to acceptable levels. The AMP Administrator or approved asbestos consultant reserves the right to stop any abatement activities until such times as fibre levels have returned to below action levels, and/or the abatement contractor has satisfactorily demonstrated to the AMP Administrator or approved asbestos consultant that the abatement activities will not generate fibre counts above the specified action levels. RP Ops shall not be held liable for any costs incurred pursuant to stop work orders issued for exceeding action levels.

Ambient	0.05 f/mL
Clean Room	0.05 f/mL
Occupational	50% of the maximum allowable exposure level for the type of respirator being worn by workers in the containment area.

Occupational sampling established satisfactory worker respiratory protection during abatement activities. Table 3 provides the maximum allowable fibre concentrations for the different types of respiratory protection. Abatement procedures must be appropriate for fibre levels as identified from the air sample results.

**Table 3. WorkSafeBC Asbestos Respiratory Protection Maximum Use Concentrations**

<b>Fibres per millimetre (f/ml)</b>	<b>Personal Protective Equipment</b>
<1	Half face piece, air-purifying respirators
<5	Full face piece, air-purifying respirators
<10	Powered air-purifying respirators
<100	Air supply, pressure demand, full face piece
<100	Air Supply, continuous flow, full face piece
<1000	SCBA, pressure demand

## Part 7 Asbestos Releases

### 5. Air Clearance Sampling

After asbestos removal and final cleaning, a contractor representative and the Contract Coordinator and/or approved abatement consultant will conduct a final visual inspection of the work site to verify all ACM has been satisfactorily removed and the area is ready for air clearance;

Once the final inspection has passed, the inside of the entire enclosure is sprayed with an approved sealant. This sealant acts as containment, capturing all residual fibres and particulate as they settle and bond them once the glue is dry. The negative air unit operates during the settling time.

Should PCM testing indicate results that exceed the fibre count method, then the sample should be re-tested using Transmission Electron Microscopy (TEM) to distinguish between asbestos and non-asbestos fibres.

After the area has been encapsulated from the glue-down, air clearance sampling must be conducted to determine safe occupancy. Allow a minimum of four hours settling/drying time before conducting air clearance air sampling. Note: The AMP Administrator may stipulate a longer settling/drying time based on the size of the enclosure area.

A minimum of two air clearance samples shall be collected for an area < 5000 ft<sup>2</sup>. The minimum recommended volume of air clearance samples is 1000 litres. One additional air clearance sample must be collected for every additional 1200 ft<sup>2</sup> or 110 m<sup>2</sup>, samples must be analysed within 24-hours of sampling.

In order to pass air clearance, the concentration of detectable fibres shall not exceed 0.01 fibres/cc. After passing the final air clearance (<0.01 fibres/ml), the containment can be dismantled.

If air clearance fibre count exceeds 0.01 fibres/ml, air clearance shall not be granted. The abatement contractor shall re-clean and apply a second application of glue encapsulate throughout the containment area. A second 4-hour settling time is required, then the area is re-sampled until a passing air clearance fibre level (<0.02 fibres/ml) is achieved. The additional work to obtain air clearance is at the cost of the abatement contractor; and, Once air clearance is attained and granted, tear down may proceed.

# Part 8 Emergency Response Procedures

In the event of accidental damage to any asbestos containing materials, the following emergency procedures must be initiated to contain the disturbance and prevent further release.

## 1. Emergency Response Procedures

- .1 The person discovering the release should immediately contact the RP Ops Contract Coordinator, or the RP Ops Trouble Desk and provide the following information;
  - Name, employer and contact phone number,
  - Location and approximate amount of released material(s),
  - Operational impacts – if any.
- .2 The Hazardous Emergency Response Team (HERT) employees should refer to the maps located in this Asbestos Management Program to determine whether the released material contains asbestos. Should the maps indicate a likelihood of asbestos containing materials, the following actions should be initiated. Note: If HERT has any doubt whether the material is asbestos containing, it should be treated as containing until proved otherwise;
- .3 The HERT team leader should contact the AMP Administrator or another member of the RP Ops U(P) Risk Management section, report the release and request further instructions beyond initial containment;
- .4 If the release occurs within a room, all exit doors should be closed and sealed with poly and duct tape. Signage should be placed on the door to warn persons not to enter;
- .5 Wherever possible, the ventilation system to the affected room should be shut down. Operations should contact the on-duty HVAC person and request the affected system be turned off;
- .6 If it is not possible to immediately shut down the affected HVAC system, a person designated by Operations should enter the area and seal any return air grills in the space;
- .7 The area should remain isolated until an abatement crew can arrive and clean up the spill;
- .8 If the release occurs in an open area, a perimeter should be established around the release to keep occupants at a safe distance. The perimeter should be as large as possible, utilizing hazard tape; and,
- .9 No-one should enter the perimeter of the isolated area without first donning the appropriate personal protective equipment.

# Part 8 Emergency Response Procedures

## 2. Emergency Response Actions – RP Ops U (P)

Upon notification of an asbestos spill, the contacted RP Ops employee shall initiate the following actions:

- .1 Contact the AMP Administrator and advise of the event;
- .2 Contact the Contract Coordinator for the abatement contractor and request emergency response to clean up the spill. Ask for a timeframe for arrival on site;
- .3 If a message has to be left at the abatement contractor 24 hour emergency number, provide your name, phone number, date and time, and details of the spill. Request that you be contacted immediately upon receipt of the message;
- .4 Should the event occur when the Contract Coordinator is not on duty, the contacted person should instruct the contractor to initiate the containment of the incident location;
- .5 Should the event occur while the Contract Coordinator is on duty, the contacted person should immediately contract the Contract Coordinator;
- .6 On arrival, the Contract Coordinator is to assess the scene to ensure that all appropriate actions are taken to minimize the impact of the spill;
- .7 Wait for arrival of the abatement contractor and provide instructions on the appropriate clean up actions, which can include, but are not limited to;
  - Clean up the release and encapsulate any disturbed ACM's. This option will generally be used when the release occurs in a public area; or,
  - Clean up the release and isolate the ACM from further disturbance. This option can be used when the release occurs in a room that can be effectively sealed, in whole or in part, until a proper abatement can be initiated.
  - Seal the area. Depending on the type and quantity of released material, it may be necessary to build decontamination facilities prior to undertaking clean up. The primary objective in this circumstance is to effectively isolate the area until the materials can be safely abated.
- .8 At the discretion of the AMP Administrator, initiate air sampling via SOA consultant around the perimeter of the release location to determine airborne concentrations of asbestos fibres.

## Part 8 Emergency Response Procedures

### 3. Emergency Asbestos Abatement Project

After the initial containment activities have been completed, the AMP Administrator shall initiate an emergency abatement project. The project shall closely follow the requirements of a normal abatement project, with the exception that work will be initiated without the prior notification to the WorkSafeBC. The Contractor must however submit the NOP-A in a timely fashion to notify the WCB that a project is starting, however it should indicate on the document that work has started due to the emergency nature of the work.

### 4. Emergency Release Response to Abatement Projects

In the event that a release occurs during the course of an abatement project, the emergency protocols developed by the abatement contractor will be utilized. Abatement contractors are required to develop and post emergency response action plans prior to removal of ACM's, and must submit the plan for approval by the AMP Administrator or designated alternate.

# Part 9 Incident Response and Reporting

For the purpose of this Asbestos Management Program, Incident definition, response and reporting requirements shall be as indicated herein. Non-asbestos related Incidents shall continue to be subject to RP Ops U(P) Risk Management protocols.

## 1. Incident Definition

- .1 Spills of asbestos containing materials outside the defined abatement area, irrespective of risk category of abatement;
- .2 Spills of non-asbestos hazardous materials outside the defined abatement area;
- .3 Any event that results in blockage to a building primary exit route for more than 10 minutes duration,
- .4 Any event that results in abandonment of an occupied space,
- .5 A breach in the containment of a high risk enclosure resulting from;
  - Any event inside or outside the containment area that damages the perimeter barrier to the extent that a physical opening is created between the containment area and the outside space, once abatement has started;
  - The incomplete establishment and/or maintaining of the containment barrier to the extent that a physical opening exists between the containment area and the outside space, once abatement has started;
  - The removal of any part of the containment barrier that results in an opening to the outside area, once abatement has started;
  - The failure to close doors, flaps or other enclosing devices to the extent that contamination into clean rooms, waste transfer rooms or decontamination rooms is created;
  - The loss of negative air inside the high risk area through cessation of the negative air units. Note: significant loss of containment will result in loss of negative air pressure, however this will be deemed an accident and subject to accident procedure; and
  - A physical opening (defined as an opening greater than 2 inches in length or 1 inch in diameter).

## Part 9 Incident Response and Reporting

- .6 An operational impact to the facilities caused by an action or inaction related to an abatement activity, including but not limited to;
  - .1 Rendering inoperable – without prior written permission from RP Ops U(P) Risk Management – any portion of a life safety system, including;
    - Fire alarm pull stations;
    - Speaker systems;
    - Fire hose cabinets outside the containment area;
    - Sprinkler systems;
    - Transponders and/or nodes;
    - Heat and/or smoke detectors; and,
    - Emergency egress signage [electrical]
  - .2 Rendering inoperable – without prior written permission from CFB Esquimalt – in whole or in part, any of the following systems;
    - Heating, Ventilation and Air Conditioning [HVAC] systems;
    - Electrical systems feeding operational equipment, offices
    - Computer, telecom and/or data transfer systems;
    - Communication systems; and,
    - Potable water or sanitary waste systems.
- .7 In addition, RP Ops U (P) shall require Contractors to submit Incident Investigation Reports for any criteria as established in Contractor Occupational Health and Safety Program.

# Part 9 Incident Response and Reporting

## 2. Incident Response and Reporting Requirements

- .1 The Contractor shall take all necessary measures to immediately limit any further exposures or potential for injury, damage or operational impact;
- .2 The Contractor shall mobilise all equipment and/or personnel necessary to immediately contain and clean up any released materials;
- .3 The Contractor shall take all necessary actions to immediately seal any breach(es) in high risk containment;
- .4 The Contractor shall be responsible to pay all costs associated with the Incident, unless and until the Contractor can demonstrate the Incident was caused by another party;
- .5 The Contractor shall make immediate notification to the Contract Coordinator and the AMP Administrator that an Incident has occurred, and shall provide sufficient information for AMP Administrator to ascertain the scope and consequences of the Incident;
- .6 Should the Incident result in an operational impact to the facility, the Contract Coordinator shall immediately notify the AMP Administrator that an Incident has occurred, and shall provide sufficient information so that the Administrator can ascertain the scope and consequences of the Incident;
- .7 The Contractor shall prepare an Incident Investigation Report detailing the circumstances of the Incident; identifying the cause(s) of the Incident, and remedial actions to be taken to prevent a re-occurrence and report through the provincial labour authority, providing the Contract Coordinator with a copy of that report.;
- .8 The Contractor shall submit the Incident Investigation Report to the Contract Coordinator within 72 hours of occurrence; and,
- .9 The period for Incident Investigation Report submission is 24 hours from the time of the incident.

# Annex A - Forms

## Notice of Asbestos Removal

<b>Base/Section</b>	
<b>Asset /Building Number</b>	
<b>Room Number</b>	
<b>Description of Work, Include work level.</b>	
<b>Schedule of Dates/Times</b>	
<b>Abatement Contractor Name: Address: Rep Name and Contact #:</b>	
<b>Air Monitoring Contractor Name: Address: Rep Name and Contact #:</b>	
<b>RP Ops Contact:</b>	
<b><u>Instructions for Completion</u></b> <i>RP Ops Contracting Officer is to complete the form and send it to the Building Manager and/or applicable Workplace Health and Safety Committee, a copy is to be sent to the local Base Safety authority and a copy is to be retained on the Project File.</i>	

### **Notice to all Building Occupants**

RP Ops is providing notification that asbestos containing materials (ACMs) will be removed by the asbestos contractor listed above. This company is licensed and accredited by the applicable authorities having jurisdiction. All proper work practices and engineering controls will be followed in accordance with Federal and Provincial Regulations. During work processes access to the abatement area will be restricted by physical barriers and marked as required by applicable legislation and policy. Areas outside the abatement area do not need to be vacated.

Where Type 3 Abatement is occurring, an Air Monitoring Consultant will be conducting air monitoring and oversight to ensure that work is conducted in the proper manner. With Level 3 work Clearance Testing will be done prior to re-occupancy. Where clearance testing is done, the final results will be provided to the Workplace Health and Safety Committee upon completion. Any questions or concerns should be directed to the RP Ops contact listed above.

# Annex A - Forms

## ACM Process Completion Report

<b>Asset /Building #</b>		<b>Asset Name</b>	
<b>Project #</b>		<b>Completion Date</b>	
<b>Contractor</b>		<b>Contract Coord</b>	

**Immediately upon completion of an 'ACM Process' the Contract Coordinator is to have this report completed and forwarded to the Regional AMP Administrator to update the applicable asbestos inventory.**

<p><b>Scope of Work :</b> Provide details on the work that was done that affected the ACM. Clearly identify what areas were removed, what areas were encapsulated, and any labelling that was added. Include attachments and pictures as necessary.</p>
<p><b>Disposal Information:</b> provide details on how removed ACM was disposed of, include waste manifest numbers.</p>
<p><b>Clearance Sampling Results:</b> if clearance sampling was required and completed provide clearance results and test methodology below.</p>

**I certify that the information provided above is accurate and correct:**

\_\_\_\_\_

Responsible Contract Authority Date

# Annex B – Asbestos and HazMat Building Survey Data

**For Hazmat or Asbestos survey data please refer to the Database located on the DWAN, RP Ops, Risk Management Section webpages.**