

CORRECTIONAL SERVICE CANADA

DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

BEAVER CREEK INSTITUTION, GRAVENHURST, ON

FEBRUARY 21, 2018





**DESIGNATED
SUBSTANCES AND
HAZARDOUS MATERIALS
SURVEY**

**BEAVER CREEK INSTITUTION,
GRAVENHURST, ON**

CORRECTIONAL SERVICE CANADA

PROJECT NO.: 181-02088-00
DATE: FEBRUARY 2018

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February 21, 2018

Public Services and Procurement Canada
4900 Yonge Street
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Attention: Selina Chowdhury, Senior Environmental Specialist, Environmental Services and Contaminated Sites, Ontario Region

Subject: Project-Specific Designated Substances and Hazardous Materials Survey

Dear Madam:

WSP Canada Inc. was retained by the Public Services and Procurement Canada (PSPC), on behalf of Correctional Service Canada, to carry out a Project-Specific Designated Substances & Hazardous Materials Survey in support of the upcoming fire alarm system upgrade project at Beaver Creek Institution, in Gravenhurst, Ontario.

The purpose of this survey is to determine the presence/absence of Designated Substances within the buildings and to provide Designated Substance information to contractors to ensure complete and compliant removal or handling of materials prior to the start of the upcoming project.

The following report discusses the methodologies and findings of this survey.

We trust that the attached report is satisfactory for your purposes at this time. Please contact the undersigned should you have any questions or concerns.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'S. Heikkila'.

Stephen Heikkila, P.Eng.
Project Manager, Environment

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Senior Project Engineer, Environment

/cl

WSP ref.: 181-02088-00

EXECUTIVE SUMMARY

WSP Canada Inc. (WSP) was retained by the Public Services and Procurement Canada (PSPC), on behalf of Correctional Service Canada (CSC) (the “Client”), to carry out a Project-Specific Designated Substances & Hazardous Materials Survey (DSHMS) in support of an upcoming fire alarm system upgrade project at the Beaver Creek Institution (BCI), in Gravenhurst, Ontario (the “subject buildings”).

The survey was conducted by WSP representatives on February 13th, 2018. The subject buildings in WSP’s Project-Specific DSHMS that will be affected but the upcoming fire alarm system upgrade project include:

- BC03 Corcan Construction Building
- BC05 Stores/Procurement/Food Distribution Building
- BC10 Chapel
- BC12 Activities Building/Duty Office
- BC13 Health Services and SIS Building
- BC14 Accommodation Unit #1
- BC15 Recreation Building
- BC16 Administration Building
- BC18 Accommodation Unit #4
- BC19 Accommodation Unit#5
- BC20 Neighbourhood Building #2
- BC23 Neighbourhood Building #1
- BC24 Accommodation Unit#3
- BC25 Accommodation Unit#2
- BC39 Fire Hall
- BC40 Family Visiting Unit
- BC41 Program Building
- BC43 Works Building
- BC53 Private Family Visits Unit
- BC55 Principle Entrance (Finance and Parole Building)
- BC59 Multipurpose Building
- BC60 Range Classroom
- FBA Gate House
- FBD Industries Building

The purpose of this survey is to determine the presence or absence of Designated Substances within the subject buildings, and to provide information to contractors to ensure complete and correct removal or handling of materials prior to the start of the upcoming project.

It is WSP’s understanding that CSC is planning to undertake a Fire System upgrade and replacement of approximately 25 fire panels in 25 buildings on the Minimum Security side of the BCI campus. Other construction work may include the following: new annunciators; notification appliances (bell, horns, etc.); initiating appliance devices (smoke alarms, smoke detectors, heat detectors, etc.); supervisor devices (tamper switches, etc.); and other components (zone fault isolators) will be installed and/or removed during the course of the project.

A Designated Substances and Hazardous Materials Survey of the Subject Buildings was previously conducted in 2003 (*Report Reference: Designated Substances and Hazardous Materials Survey of the Correctional Services Canada, Beaver*

Creek Institution, Gravenhurst, Ontario–Oakhill Environmental, December 2003). The 2018 DSHMS completed by WSP relies on information contained in this past report and should be read in conjunction with it.

During the time of the survey, WSP staff was unable to enter and assess the following buildings:

- BC40 Family Visiting Unit
- BC53 Private Family Visits Unit

Designated Substances or hazardous materials were not identified or suspected to be present in the following buildings in the areas affected by the fire alarm system upgrade project:

- BC03 Corcan Construction Building
- BC15 Recreation Building
- BC39 Fire Hall
- BC43 Works Building
- BC55 Principle Entrance (Finance and Parole Building)
- BC59 Multipurpose Building
- BC60 Range Classroom
- FBA Gate House
- FBD Industries Building

A summary of the results of WSP’s site inspection and bulk sampling, plus previous report findings is presented below:

Table 1 - Summary of Designated Substances & Hazardous Materials Survey Findings

MATERIAL	SURVEY FINDINGS
Asbestos	<p>All building materials sampled and analyzed for the project-specific survey were found to be non-asbestos-containing. However, asbestos-containing pipe fittings, one (1) of which was observed to be in poor condition in 2018, were previously confirmed to be present in the basement mechanical room (B01) of Building BC13 (Heath Services and SIS Building) and Building BC12 (Activities Building/Duty Office).</p> <p>Notes:</p> <ul style="list-style-type: none"> — Asbestos-containing materials may be present in inaccessible areas throughout the subject buildings (i.e. wall and ceiling cavities, underground, etc.). — Asbestos-containing parging cement on pipe fittings were previously identified by Oakhill Environmental in Buildings BC12 and BC13, and are presumed to be present in concealed building spaces.
Lead	<p>Based on the laboratory results, the six (6) paint samples collected and analyzed have non-detectable concentrations of lead.</p> <p>Lead is expected or presumed to be present in the following building components:</p> <ul style="list-style-type: none"> — lead-acid batteries associated with emergency lighting and exit signage; — as a component in ceramic building products such as tiles and bricks; — as a component of the solder on sweated joints between copper pipe and fittings; — as a component of the solder on wire connections of electric components; and, — as a malleable metal sheeting/flashing around roof edges, vent stacks, HVAC fixtures, etc.
Mercury	<p>Although no samples were analyzed for mercury, it is presumed to be present as a gas in fluorescent and CFL light tubes.</p>

MATERIAL SURVEY FINDINGS

Polychlorinated Biphenyl (PCB)	Fluorescent light ballasts were observed within the subject buildings. These ballasts may contain PCBs. Other electrical equipment suspected to contain PCBs, including transformers, may be present within the subject buildings.
Silica	Building materials and components known to contain silica such as glass, concrete, masonry, stone and mortar etc., were observed throughout the subject buildings.
Radioactive Materials	Smoke/heat detectors which may contain a radioactive power source were observed throughout the subject buildings.
Mould	Water damage and suspected mould contamination was observed on drywall in the mechanical rooms of BC14 (Accommodation Unit #1) and BC25 (Accommodation Unit #2).

RECOMMENDATIONS

Prior to the start of the upcoming project, access should be provided into buildings: BC40 Family Visiting Unit and BC53 Private Family Visits Unit, so that the absence of designated substances can be confirmed in the work areas within these two buildings, as they were inaccessible during the time of this survey.

If, during the upcoming project, additional materials suspected of containing asbestos are encountered, they must be handled in accordance with the appropriate guidelines and regulations. It should be noted that asbestos may be present in the enclosed spaces not accessible at the time of the site visit.

Except for asbestos, all other Designated Substance regulations apply to industrial establishments and not to construction. Due to this condition, it is imperative that any contractor retained for this upcoming project has a proven record in managing Designated Substances and operates under a control program. All Designated Substances must be handled in accordance with the appropriate guidelines and regulations. Designated Substance and hazardous material information will require updating if corrective measures have been instituted and materials have been removed from the building.

Special precautions should be taken when disturbing any concrete given the presence of silica. All Designated Substances must be handled in accordance with the appropriate guidelines and regulations. The Ministry of Labour (MOL) has published guidelines for handling and controlling lead and silica in construction and it is recommended that these guidelines be followed when removing and cutting into the concrete. Coring, sawing or breaking up the materials containing silica, lead and potentially arsenic should be completed only with appropriate dust suppression methods, proper respiratory protection and general worker safety precautions as outlined in the MOL Guidance documents and OHSA.

The presence of mercury within assembled units (e.g. fluorescent light bulbs) should not be considered a hazard provided that the assembled units remain sealed and intact. Avoid direct skin contact with mercury and avoid inhalation of mercury vapour. Dispose of mercury following applicable legislative requirements.

Atomic Energy Control Board (AECB) guidelines state that smoke detectors containing more than 5 µCi of Am-241 or any amount of Radium-226 must be disposed of through a consultant or AECB licensed waste facility. The current AECB guidelines allow for the disposal of smoke detectors with an Am-241 isotope source of less than 5.0 µCi to a regular landfill site. Smoke detectors must be disposed of in packages containing a maximum of ten smoke detectors per package.

If mould is discovered during the upcoming project, mould-contaminated materials should be removed/handled in accordance with the *Canadian Construction Association document CCA 82/2004*. Contractors should be warned of the potential presence of mould and every precaution should be taken to prevent airborne exposure to workers where mould is present and where workers are likely to inhale or ingest mould.

Complete commentary on each of the Designated Substances in the project area will be discussed in the report to follow. This executive summary is not intended to substitute for the complete report, nor does it discuss certain specific issues documented within the report.



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1 INTRODUCTION

1.1 BACKGROUND

WSP Canada Inc. (WSP) was retained by the Public Services and Procurement Canada (PSPC), on behalf of Correctional Service Canada (CSC) (the “Client”), to carry out a Project-Specific Designated Substances & Hazardous Materials Survey (DSHMS) in support of an upcoming fire panel upgrade project at the Beaver Creek Institution (BCI), in Gravenhurst, Ontario (the “subject buildings”).

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CSC is planning to undertake a Fire System upgrade and replacement of approximately 25 fire panels in 25 buildings on the Minimum Security side of the BCI campus. Other construction work may include the following: new annunciators; notification appliances (bell, horns, etc.); initiating appliance devices (smoke alarms, smoke detectors, heat detectors, etc.); supervisor devices (tamper switches, etc.); and other components (zone fault isolators) will be installed and/or removed during the course of the project.

A Designated Substances and Hazardous Materials Survey of the Subject Buildings was previously conducted in 2003 (*Report Reference: Designated Substances and Hazardous Materials Survey of the Correctional Services Canada, Beaver Creek Institution, Gravenhurst, Ontario-Oakhill Environmental, December 2003*). The 2018 DSHMS completed by WSP relies on information contained in this past report and should be read in conjunction with it.

1.2 SURVEY OBJECTIVES

This survey is required to satisfy a building owner’s requirements under Section 30 of the *Ontario Occupational Health & Safety Act (OHS)* which requires building owners to determine if there are any Designated Substances present, prior to commencement of a project, which may involve construction, renovation or demolition related activities. This information allows workers to take appropriate steps to prevent accidental exposure to these harmful substances. This report should be provided to all maintenance workers, prospective contractors (and in turn to their sub-trades) who are likely to handle, come into contact with, or disturb building materials. Contractors who may work in close proximity to the identified materials and who may also disturb the materials should also be notified.

The primary objectives of the survey were to:

- Develop an up-to-date inventory, and gain a better understanding of the Designated Substances and/or hazardous materials that are present in areas of the subject buildings scheduled for the upcoming fire alarm system upgrade project;
- Document their locations, applications, concentrations, quantities, and conditions in the subject building in order to provide workers, and prospective contractors, with adequate information to prevent accidental exposures; and
- Provide recommendations for the safe removal, handling and disposal of the identified Designated Substances and hazardous materials as necessary.

The asbestos information in this survey report complies with the requirements of the *OHS Ontario Regulation 278/05: Designated Substance - Asbestos on Construction Projects and in Building and Repair Operations (O. Reg. 278/05)* with respect to asbestos-containing materials for the structures.

Ontario Regulation 490/09 (O. Reg. 490/09) states that all necessary measures and procedures are to be taken to ensure the time-weighted average exposure of a worker to any form of airborne asbestos does not exceed 0.1 fibres per cubic centimeter of air, averaged over an 8-hour work period. In order to abide by this regulation,

contractors specializing in asbestos removal are required to remove all asbestos-containing building materials from the building prior to any renovation or demolition that will disturb these materials.

1.3 SCOPE OF WORK

The scope of this work program was to identify suspected Designated Substances and hazardous materials within the subject buildings. This DSHMS entailed:

- Visual inspection of the accessible subject areas for Designated Substances and hazardous materials;
- Collection of bulk samples of materials suspected to contain asbestos according to the requirements stipulated in *O. Reg. 278/05*;
- Assessment of the condition of the asbestos-containing materials;
- Collection of a representative number of bulk paint samples;
- Inventory of (visibly) evident sources of mercury (e.g. thermostats);
- Assessment of the likelihood of exposure to designated substances with recommendations for appropriate corrective action where required;
- Visual identification of suspected and/or obvious signs of mould; and
- Visual identification of other Designated Substances and hazardous materials including equipment containing ODS, fuel, oil and/or waste oil storage, chemical storage, and/or radioactive materials. Where possible name plate/label information and quantities were recorded.

Some areas of the building were considered not accessible to the surveyor (ie. wall cavities, boilers, furnaces, electrical equipment, etc.), and materials within such areas are suspected to contain asbestos and other Designated Substances and hazardous materials.

The survey included the identification of potential friable and non-friable asbestos-containing materials within the structures. Asbestos means any of the following fibrous silicates: actinolite, amosite, anthophyllite, chrysotile, crocidolite or tremolite. According to the above-mentioned *Ontario Regulation 278/05*, the term 'friable material' is applied to a material that when dry, can be crumbled, pulverized or powdered with moderate hand pressure. Asbestos materials that are friable have a greater potential to release airborne asbestos fibres when disturbed. Common friable asbestos-containing building materials used in the past include sprayed fireproofing, stucco texture coat, and thermal pipe and jacket insulation.

Common non-friable asbestos containing materials include vinyl floor tiles, gasket materials, asbestos cement (Transite™) pipe, Transite™ board and asbestos textiles. If these materials do however release fine dust due to deterioration or during removal, the free dust is considered friable.

2 METHODOLOGY

2.1 GENERAL SURVEY METHODOLOGY

WSP's survey sought to identify those substances defined as Designated Substances under the *Ontario Occupational Health and Safety Act* including: asbestos (friable and non-friable), lead, mercury, silica, benzene, acrylonitrile, arsenic, coke oven emissions, ethylene oxide, isocyanates, and vinyl chloride. In addition, other hazardous materials, such as PCBs, ozone-depleting substances (ODS), urea-formaldehyde foam insulation (UFFI) and other stored chemicals and wastes were included in the survey scope.

WSP's surveyors performed a systematic survey of the subject building and structures for the purposes of identifying Designated Substances and hazardous materials and documenting observations made about their locations, estimated quantities and respective conditions. These observations form the basis for developing the recommendations provided within this report.

The survey of the building for Designated Substances consisted of a walk through and physical examination of suspected materials in accessible areas of the building. A physical examination was completed to assess the condition of materials and to examine for underlying layers. In situations where asbestos-containing materials or other Designated Substances extended into a non-accessible area, such as asbestos cement parging on mechanical pipes it was assumed that the asbestos-containing materials were also present in these areas and were reported as such.

Survey procedures specific to asbestos and lead are documented in the following sections of this report.

2.2 ASBESTOS SURVEY METHODOLOGY

The surveyors inspected the subject building for the presence of friable and non-friable asbestos-containing materials (ACM). Examples of ACM commonly found in buildings may include:

- Sprayed insulation
- Acoustic/texture plaster
- Drywall joint compound
- Mechanical insulation
- Asbestos cement
- Piping
- Acoustic ceiling tiles
- Vinyl floor tiles and vinyl sheet flooring
- Plaster

Bulk samples were collected from suspect materials (i.e. materials known as having the potential to be asbestos-containing) and analyzed to identify or confirm the presence/absence of asbestos. Asbestos samples are collected by taking a small volume of material (approximately two square centimeters in size) from either intact material or preferably from a damaged section. The collected samples were placed in zipper storage plastic bags, sealed and forwarded to an analytical laboratory.

All bulk samples collected were submitted to an accredited, independent laboratory for analysis (accompanied by a chain of custody form) of asbestos content via US EPA Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials in accordance with the requirements of *O. Reg. 278/05*. The laboratory was instructed to use "stop-positive" analysis when asbestos is identified via Polarized Light Microscopy (PLM) analysis.

The number of bulk samples required, in order to establish whether a material is asbestos-containing according *O. Reg. 278/05*, is summarized in Table 2.

Table 2 - Minimum Number of Bulk Samples to be collected under O. Reg. 278/05 According to Material Area, Application and Friability

TYPE OF MATERIAL	SIZE OF HOMOGENEOUS MATERIAL	MINIMUM NUMBER OF BULK SAMPLES
Surfacing material, including without limitation material that is applied to surfaces by spraying, by troweling or otherwise, such as acoustical plaster on ceilings, fireproofing materials on structural members and plaster	Less than 90 m ²	3
	90 m ² or more, but less than 450 m ²	5
	450 m ² or more	7
Thermal insulation, except as described below	Any size	3
Thermal insulation patch	Less than 2m or 0.5 m ²	1
Other material	Any size	3

As per the requirements set out in O. Reg. 278/05, samples were collected and submitted for asbestos analysis as part of this survey. In accordance with the analysis techniques required by O. Reg. 278/05:

- for layered materials, subsamples are taken from each individual or discrete layer and each subsample is then treated as a discrete sample; and
- if a material is found to contain greater than 0.5% asbestos, additional bulk material samples taken from the same homogeneous material are not required to be analyzed (“stop positive analysis”).

As per these requirements, a total of one-hundred and three (103) samples were analyzed by the laboratory for this assessment.

2.3 LEAD SURVEY METHODOLOGY

Bulk paint samples (paint chips) were collected from each distinct colour of paint observed within the subject areas. Samples were collected with the aid of a thin-bladed knife, which was cleaned prior to each sampling event. WSP’s surveyor selected sample locations where it appeared that the paint application was most representative of all areas on which it was applied. Each paint chip sample was placed in a clear bag with a tight closure, uniquely labelled and then placed in a second, similar bag. A chain of custody form was completed and accompanied the bulk samples to an accredited, independent laboratory for analysis of lead content. Lead analysis was performed following ASTM Method, ASTM D3335-85A “Standard Method to Test for Low Concentrations of Lead in Paint by Atomic Absorption Spectrophotometry”.

2.4 SILICA

The surveyor inspected the subject areas for the presence of materials known to contain silica. Silica is present in materials such as glass, concrete, masonry, stone and mortar which are prevalent materials in building construction. No samples were collected or analyzed.

2.5 MERCURY

The surveyor inspected the subject areas for equipment which is likely to contain mercury. Pertinent information of the suspected equipment including: manufacturer, dates, model and serial numbers, and quantities were noted, when available. No samples were collected or analyzed.

2.6 OZONE-DEPLETING SUBSTANCES (ODS)

The surveyor inspected the subject areas for equipment which is likely to contain ODS. Pertinent information of the suspected equipment including: manufacturer, dates, model and serial numbers, and quantities were noted, when available. No samples were collected or analyzed.

2.7 POLYCHLORINATED BIPHENYLS (PCB)

The surveyor inspected the subject areas for equipment which may contain PCBs. Equipment that is generally suspected of containing PCBs includes lamp ballasts, transformers, hydraulic fluid, compressors, switchgears, capacitors and other electric equipment. Pertinent information of the suspected equipment including: manufacturer, dates, model and serial numbers, and quantities were noted, when available. No samples were collected or analyzed.

2.8 MOULD

The surveyor inspected the subject areas for the presence of mould. This included a non-intrusive visual assessment of exterior and interior building material surfaces and components for evidence of obvious visible mould, and/or areas conducive to mould growth (i.e. demonstrating significant moisture saturation and water damage). No samples were collected or analyzed.

3 REGULATORY CONTEXT

3.1 DESIGNATED SUBSTANCES

Section 30 of the *Occupational Health and Safety Act* stipulates that prior to the commencement of a project a list shall be prepared of all Designated Substances that are present at the project site (i.e. a Designated Substances survey). In accordance with *OHSA*, the locations of Designated Substances must be identified in writing to all prospective constructors, contractors and sub-contractors who may work, disturb or come into contact with this type of material, at the same time as, or prior to, project tendering.

The term “Designated Substance” refers to the eleven chemical or physical agents specifically identified within the Act. Each of these substances is governed by a consolidated Designated Substances regulation, *O. Reg. 490/09*, which defines the minimum health and safety requirements for assuring safe worker-substance interaction as well as the obligations of employers and workers in workplaces containing these substances. *O. Reg. 490/09* further stipulates the maximum concentrations of each of the respective substance to which a worker may be exposed, according to short-term exposure values and time-weighted average exposure values.

3.2 ADDITIONAL REGULATORY REQUIREMENTS FOR ASBESTOS

Among the Designated Substances, asbestos is unique in that it is governed by two regulations under the Act - one for the general mining and processing operations of asbestos and one for asbestos on construction projects and in buildings and repair operations.

O. Reg. 278/05, made under *OHSA*, entitled “Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations” came into effect on November 1, 2005, with some sections contained therein becoming effective on November 1, 2007. This regulation revoked and replaced the previous asbestos regulation, *O. Reg. 838/90*.

CANADA LABOUR CODE

Since the subject property is considered a federal site, and will be accessed by federal employees, the *Canada Labour Code (Part II) (the Code)* applies. Under *The Code*, the *Canada Occupational Health and Safety Regulations (SOR/86-304)* govern the health and safety of employees working in federally-regulated industries and organizations which includes the federal government and crown corporations. *The Code* establishes responsibilities and requirements of employers, managers and supervisors who act on behalf of the employer and employees, in order to maintain safe workplaces and working environments.

Part X of *SOR/86-304* states that every employer shall keep and maintain a record of all hazardous substances that, in the work place, are used, produced, handled, or stored for use in the work place, and may either keep and maintain such a record in the work place or keep and maintain a centralized record in respect of several work places, in one work place. In addition, *SOR/86-304* details requirements for hazard investigations, sampling, medical examinations, signage/labelling, training, and the establishment of an Asbestos Exposure Management Plan.

NATIONAL JOINT COUNCIL - OCCUPATIONAL HEALTH AND SAFETY DIRECTIVE

The National Joint Council (NJC) *Occupational Health and Safety Directive (the OHS Directive)* contains enhancements to *the Code* for dealing with asbestos and materials containing asbestos. *The OHS Directive* states that departments and agencies will comply with Public Works and Government Services Canada Departmental Policy *DP 057*, which was recently replaced by the Public Services and Procurement Canada

Asbestos Management Standard. This DSHMS report should be read in conjunction with the PSPC *Asbestos Management Standard* and the site-specific Asbestos Management Plan, if applicable.

3.3 ADDITIONAL REGULATORY REQUIREMENTS FOR LEAD

The Ontario Ministry of Labour (MOL) has not prescribed specific criteria for classification of lead-containing paints or other surface coatings and construction materials. The *Surface Coating Materials Regulation (SOR/2005-109)* made under the federal *Hazardous Products Act (HPA)* prescribes an acceptable level of 0.009% (90 ppm) lead by dry weight or less, as determined by bulk chemical analysis in accordance with good laboratory practises. Under *SOR/2005-109* Section 4.2, the following paints and surface coatings are excluded from the above noted acceptable lead level:

- 1 as an anti-corrosive or an anti-weathering coating applied on the interior or exterior surface of any building or equipment that is used for an agricultural or industrial purpose;
- 2 as an anti-corrosive or an anti-weathering coating applied on any structure other than a building, that is used for an agricultural, industrial or public purpose;
- 3 as a touch-up coating for metal surfaces;
- 4 on traffic signs;
- 5 for graphic art on billboards or similar displays;
- 6 for identification marks in industrial buildings; or
- 7 as materials for the purposes of arts, crafts or hobbies, other than material for use by children.

However, based on a recent publication (*EACO Lead Guideline For Construction, Renovation, Maintenance or Repair*, dated October 2014) from the Environmental Abatement Council of Ontario (EACO), an industry group representing consultants and contractors in the Ontario abatement industry, various occupational and workplace safety authorities and agencies consider that any detectable amount of lead in paint and similar materials has the potential to produce an airborne hazard to workers and building occupants when these materials are disturbed.

As such, for the purpose of this survey, WSP has classified any material containing detectable/measurable amounts of lead as “lead-containing” materials and recommends that all disturbances to these materials be conducted in accordance with the EACO or MOL *Guideline for Lead on Construction Projects*.

3.4 ADDITIONAL REGULATORY REQUIREMENTS FOR WASTE MANAGEMENT

The disposal of Designated Substances is regulated under the Ontario *Environmental Protection Act*, specifically *R.R.O. 1990, Regulation 347, General - Waste Management* (most recently amended by *O. Reg. 334/13*). The regulation details the minimum requirements for the appropriate transport and disposal of wastes.

3.5 OTHER APPLICABLE REGULATIONS AND GUIDELINES

The following regulations and guidance documents may also apply to this survey:

- Guideline for Lead on Construction Projects (MOL, September 2004, as amended)
- Guideline for Silica on Construction Projects (MOL, September 2004, as amended)

- The United States Department of Housing and Urban Development (HUD) Guidelines for the Evaluation and Control of Lead-Based Paint in Housing
- Canadian PCB Regulations (*SOR/2008-273*)
- *O. Reg. 362* Waste Management – PCBs
- Mercury-Containing Products Pollution Prevention Fact Sheet #21 (Ministry of Environment (MOE), September 2001, as amended)
- *R.R.O. 1990, Reg. 347*: General Waste Management
- *R.R.O. 1990, Reg. 833*: Control of Exposure to Biological or Chemical Agents
- Canadian Chlorofluorocarbon Regulations (*SOR/90-127*), Ozone-Depleting Substances Regulation (*SOR/94-408*) and Ozone-Depleting Substances Products Regulations (*SOR/90-584*)
- Federal Halocarbon Regulations (*SOR/2003-289*)
- *O. Reg. 463/10*: Ozone-Depleting Substances and Other Halocarbons
- *O. Reg. 180/07*: Refrigerants
- Lead Guideline For Construction, Renovation, Maintenance or Repair (Environmental Abatement Council of Ontario, October 2014)
- Mould Abatement Guidelines (Environmental Abatement Council of Ontario, 2010)
- CCA 82/2004 – Mould Guidelines for the Canadian Construction Industry (Canadian Construction Association, 2004)

4 OBSERVATIONS AND RESULTS

Information in this section of the report should be provided to all prospective contractors, tenants, and/or workers who are likely to handle, come into contact with, or disturb asbestos or other designated substances.

This information may require updating upon the removal of Designated Substances from various sections of the building upon completion of the renovations. A close out report stating that the materials are no longer present is also required once the materials are removed. If ACM is to remain in place, *O. Reg. 278/05* requires the preparation and establishment of an Asbestos Management Plan for the building, if applicable.

Contractors and maintenance personnel should be warned of the possibility of undisclosed materials when breaking into enclosed areas. Friable or non-friable building materials discovered in enclosed areas should be treated as asbestos-containing until proven otherwise and other substances, self-evident as Designated Substances or hazardous materials, should be handled in a likewise fashion.

4.1 ASBESTOS

4.1.1 ASBESTOS-CONTAINING MATERIALS

The *Canada Occupational Health & Safety Regulations (SOR/86-304)* and *Ontario Regulation 278/05 (O. Reg. 278/05)* both establish definitions of asbestos-containing material (ACM), however, *O. Reg. 278/05* is more stringent. In accordance with the requirements of *O. Reg. 278/05*, homogenous materials (i.e. materials uniform in color and texture) must be considered to be asbestos-containing, if any sample which is collected from that homogeneous material, is identified to have an asbestos concentration of 0.5% or greater.

A total of one hundred and three (103) building material samples were collected from seventeen (17) homogeneous building materials and submitted for laboratory analysis of asbestos content. The table below summarizes the results of bulk material samples collected from suspect materials which had either no detectable concentrations of asbestos, or had asbestos concentrations less than the regulated threshold limit of 0.5% (by weight), and therefore can be considered as “non-asbestos” in accordance with *O. Reg. 278/05*.

Table 3 - Summary of Bulk Samples Identified as "Non-Asbestos"

MATERIAL DESCRIPTION / LOCATION	SAMPLE ID ¹
Drywall Joint Compound / BC41 Program Building	BC41-DJC-1A, 1B, 1C
Drywall Joint Compound / BC25 Accommodation Unit #2	BC25-DJC-2A,2B,2C,2D,2E,2F,2G
Drywall Joint Compound / BC23 Neighbourhood Building #1	BC23-DJC-3A,3B,3C,3D,3E,3F,3G
Drywall Joint Compound / BC24 Accommodation Unit #3	BC24-DJC-4A,4B,4C,4D,4E,4F,4G
Drywall Joint Compound / BC14 Accommodation Unit #1	BC14-DJC-5A,5B,5C,5D,5E,5F,5G
Drywall Joint Compound / BC20 Neighbourhood Building #2	BC20-DJC-6A,6B,6C,6D,6E,6F,6G
Drywall Joint Compound / BC18 Accommodation Unit #4	BC18-DJC-7A,7B,7C,7D,7E,7F,7G
Drywall Joint Compound / BC19 Accommodation Unit #5	BC19-DJC-8A,8B,8C,8D,8E,8F,8G
Drywall Joint Compound / BC10 Chapel	BC10-DJC-9A, 9B, 9C
Drywall Joint Compound / BC13 Health Services & S.I.S. Building	BC13-DJC-10A,10B,10C,10D,10E,10F,10G

MATERIAL DESCRIPTION / LOCATION	SAMPLE ID ¹
2'x4' Ceiling Panels - White with large fissures and small pinholes / BC13 Health Services & S.I.S. Building	BC13-CP-11A,11B,11C
Drywall Joint Compound / BC12 Activities Building & Duty Office	BC12-DJC-12A,12B,12C,12D,12E,12F,12G
2'x4' Ceiling Panels - White with small fissures and small pinholes / BC12 Activities Building & Duty Office	BC12-CP-13A,13B,13C
Grey Spray-on Fireproofing / BC12 Activities Building & Duty Office	BC12-FFP-14A,14B,14C,14D,14E,14F,14G
Drywall Joint Compound / BC05 Stores/Procurement/Food Distribution Building	BC05-DJC-15A,15B,15C,15D,15E,15F,15G
Drywall Joint Compound / BC16 Administration Building	BC16-DJC-16A,16B,16C,16D,16E,16F,16G
Ceiling Texture Coating / BC16 Administration Building	BC16-TC-17A,17B,17C,17D,17E,17F,17G

- 1 For sample ID and concentration levels refer to Appendix A: Analytical Results – Asbestos & Lead.
- 2 Material previously sampled by Oakhill Environmental (see *Designated Substances and Hazardous Materials Survey of the Correctional Services Canada, Beaver Creek Institution, Gravenhurst, Ontario-Oakhill Environmental, December 2003*).

Asbestos-containing paring cement on pipe fittings was previously identified by Oakhill Environmental within buildings BC12 and BC13. WSP's site observations indicated that asbestos abatement previously took place in some locations; however, asbestos-containing pipe fittings are presumed to be present in other concealed areas of the subject buildings (ie. ceiling & wall cavities). One (1) asbestos-containing pipe fitting was observed to be in poor condition in the basement mechanical room (B01) of Building BC13 (see Appendix B – Site Photographs). This material should be removed following Type 2 (glovebag) procedures in order to comply with the requirements of *O. Reg. 278/05* and the *PSPC Asbestos Management Standard*.

WSP was not provided access to buildings BC40 Family Visiting Unit and BC53 Private Family Visits Unit during the site visit. As a result, the absence of Designated Substances could not be confirmed in the two (2) buildings. Prior to the start of the upcoming project, the absence of Designated Substances should be confirmed in the areas of work within the buildings.

4.1.2 SUSPECTED ASBESTOS-CONTAINING MATERIALS

Certain building materials which have historically contained asbestos were not included in the survey since they were inaccessible, are used in a random fashion, or have a low risk of asbestos fibre release.

These materials include:

- Buried services such as underground piping; these pipes were commonly manufactured from a non-friable form of asbestos cement but are inaccessible for sampling without excavation work. Site drawings should be consulted and reviewed to ascertain the presence or absence of such structures.
- Floor levelling compounds; these materials were used in a random fashion, may or may not contain asbestos, and require demolition of floor finishes to access for sample collection. Floor levelling compounds were not observed but may be present.
- Packing materials in valves, fittings, etc., may be present but are inaccessible without demolition activities (e.g. within concealed areas behind bulkheads).

In addition, inspection of mechanical equipment such as furnaces, HVAC systems, chimneys, within electrical equipment or behind solid wall/ceiling systems was not conducted due to safety or access limitations. These areas are considered not accessible to the surveyor and as such materials suspected to contain asbestos may be present within these inaccessible areas, including:

- mechanical insulation
- spray-on fireproofing materials
- electrical wiring insulation
- underground utilities such as sewers or drain lines
- electrical conductors
- high temperature gaskets
- incandescent light fixture backing
- ductwork connections
- thermal insulators around electrical elements or baseboard heaters
- interior refractory materials in chimneys or boilers

Once services are decommissioned, these areas should be inspected and/or sampled for presence or absence of asbestos.

If demolition activities are likely to disturb the materials, it is required that all identified asbestos-containing materials be removed in accordance with *O. Reg. 278/05*. If any potential asbestos-containing materials are encountered unexpectedly, a qualified consultant should be contacted to sample, monitor and/or document the removal of asbestos-containing materials, and to ensure that appropriate procedures are being followed.

4.2 LEAD

A total of six (6) paint samples were collected and analyzed at the time of the investigation. The table below summarizes the results of laboratory analyses for the bulk paint and surface coating samples collected during the survey.

Table 4 - Summary of Lead Concentrations in Bulk Paint Samples

MATERIAL DESCRIPTION	ASSESSMENT	ACTION ¹
Beige Paint Observed on the walls within BC25.	<i>Sample ID:</i> BC25-Pb-01 <i>Concentration:</i> <85 ppm <i>Condition:</i> Good	<p>Samples have lead concentrations less than the laboratory detection limit of 90 ppm.</p> <p>No remedial action is required.</p>
Beige Paint Observed on the walls within BC23.	<i>Sample ID:</i> BC23-Pb-02 <i>Concentration:</i> <82 ppm <i>Condition:</i> Good	
Beige Paint Observed on the walls within BC14.	<i>Sample ID:</i> BC14-Pb-03 <i>Concentration:</i> <83 ppm <i>Condition:</i> Good	
White Paint Observed on the walls within BC18.	<i>Sample ID:</i> BC18-Pb-04 <i>Concentration:</i> <83 ppm <i>Condition:</i> Good	

MATERIAL DESCRIPTION	ASSESSMENT	ACTION ¹
Light Blue Paint Observed on the walls within BC13.	Sample ID: BC13-Pb-05 Concentration: <87 ppm Condition: Good	Samples have lead concentrations less than the laboratory detection limit of 90 ppm. No remedial action is required.
Light Blue Paint Observed on the walls within BC05.	Sample ID: BC05-Pb-06 Concentration: <90 ppm Condition: Good	

¹ For sample ID and concentration levels refer to Appendix A: Analytical Results – Asbestos & Lead.

Lead is presumed to be present in the following building components:

- lead-acid batteries located within emergency lighting and exit signage;
- as a component in ceramic building products such as tiles and bricks;
- as a component of the solder on sweated joints between copper pipe and fittings;
- as a component of the solder on wire connections of electric components; and,
- as a malleable metal sheeting/flashing around roof edges, vent stacks, HVAC fixtures, etc.

Work that will disrupt and/or pulverize (including drilling, cutting, grinding or abrading) confirmed or suspected lead-containing materials must follow the recommendations provided in the EACO *Lead Abatement Guidelines* (dated 2014) or Ministry of Labour *Guideline for Lead on Construction Projects*, dated September 2004 (revised April 2011). In addition, the aforementioned painted surfaces (containing lead) should be handled with appropriate health and safety precautions so as to comply with requirements of the Designated Substances regulation, *O. Reg. 490/09*, and disposal of these materials must also comply with the requirements of *O. Reg. 347 – General – Waste Management*.

4.3 OTHER DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS

The following table summarizes other Designated Substances and hazardous materials which were also included in the survey. Identification of these materials and substances were based on visual observations only, and where appropriate, recommendations and necessary actions have been provided.

All designated substances must be handled in accordance with the appropriate guidelines and regulations. Designated Substance and Hazardous Material information will require updating as corrective measures are instituted and materials have been removed from various sections of the building.

Table 5 - Summary of Other Designated Substances and Hazardous Materials

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Mercury	Mercury is used in thermometers, batteries and some electrical switches. It is also used in dental fillings and in latex paint to protect against fungal attack and mildew. Mercury vapour is also present as a vapour in fluorescent lights, metal halide lights and mercury vapour lights.	Although no samples were analyzed for mercury, it is presumed to be present in the following building components: — as a gas in fluorescent light tubes.	The presence of mercury within assembled units (e.g. thermostats, thermometers, fluorescent light bulbs) should not be considered a hazard provided that the assembled units remain sealed and intact. Avoid direct skin contact with mercury and avoid inhalation of mercury vapour. Dispose of mercury following applicable legislative requirements, including <i>R.R.O. 1990 - Reg. 347 - General - Waste Management</i> .
Ozone-Depleting Substances (ODS)	It is the intention of the federal government to phase out the use of ODSs by the year 2030 in order to protect the upper atmosphere. The MOE has issued <i>Regulation 356</i> regarding the use, disposal and recycling of ODSs. Recapturing of ODSs during servicing must be done by licensed personnel.	ODSs are not expected to be present in the areas within the subject buildings affected by the upcoming fire alarm system upgrade.	N/A
Silica	Silica, or silicon dioxide (SiO ₂), is the basic component of sand, quartz and granite rock. Crystalline Silica (the designated substance) is encountered in industry in three forms: quartz, tridymite, and cristobalite.	Crystalline Silica should be assumed to be present in brick, concrete, asphalt, cement and mortar.	<i>O. Reg. 490/09</i> regarding silica as a designated substance applies to areas where airborne silica is present and where workers are likely to inhale, ingest or absorb silica. Every precaution and procedure should be taken during demolition or renovation activities to control the time-weighted exposure of a worker to airborne silica and exposure should not exceed 0.05 milligrams Cristobalite per cubic meters of air, or 0.1 milligrams Quartz or Tripoli per cubic meters of air. Coring, sawing, or breaking up the materials containing silica should be completed only with appropriate dust suppression methods, proper respiratory protection and general worker safety precautions as outlined in the MOL Guidance document and the <i>Occupational Health and Safety Act</i> .

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Radioactive Materials	Smoke/heat detectors may contain a radioactive power source. Atomic Energy Control Board (AECB) guidelines state that smoke detectors containing more than 5 µCi of Am-241 or any amount of Radium -226 must be disposed of through a consultant or AECB licensed waste facility. The current AECB guidelines allow for the disposal of smoke detectors with an Am-241 isotope source of less than 5.0 µCi to a regular landfill site.	Smoke/heat detectors were observed in various locations throughout the subject buildings, and will be removed and replaced as part of the upcoming fire alarm system upgrade project.	Smoke detectors must be disposed of in packages containing a maximum of ten smoke detectors per package in accordance with all applicable manufacturer guidelines and applicable regulations.
Mould	Mould is a group of various species of simple, microscopic organisms found in every ecological niche, indoors and outdoors. Moulds are necessary for recycling of organic materials in nature. To grow, mould needs: <ul style="list-style-type: none"> — A mould spore — An organic food source (i.e. paper, drywall, wood, dirt, paint, etc.) — Moisture — Time (this will vary depending on the site-specific conditions, including the cleanliness of the water source) 	Significant mould growth was not observed within the subject buildings affected by the upcoming fire alarm system upgrade. However, water damage and suspected mould contamination was observed on drywall in the mechanical room of BC25 Accommodation Unit #2.	If found during renovation/ demolition, mould-contaminated materials should be removed and handled in accordance with the <i>Canadian Construction Association document CCA 82/2004</i> . Contractors should be warned of the presence of mould and every precaution should be taken to prevent airborne exposure to workers where mould is present and where workers are likely to inhale or ingest mould.

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Polychlorinated Biphenyls (PCB)	The federal Regulation <i>SOR/2008-273</i> (September 5, 2008) states that any solid material containing 50 parts per million (ppm) or more of PCBs must be handled as a PCB-containing material in accordance with all applicable regulations.	Fluorescent light ballasts were observed within the subject buildings. These ballasts may contain PCBs. Other electrical equipment suspected to contain PCBs, including transformers, may be present within the subject buildings.	When decommissioned, ballasts which do not have a “No PCBs” indicator on the label, manufacturer’s codes should be compared with Environment Canada’s Identification of Lamp Ballasts Containing PCBs <i>EPS 2/CC/2</i> (revised). Other suspect equipment should be sampled prior to decommissioning. Handle, store and dispose of PCB-containing materials in accordance with <i>Federal PCB Regulation SOR/92-507</i> and <i>R.R.O. 1990 - Reg. 347 - General - Waste Management</i> regulations.
Arsenic	Arsenic is used with other metals (chiefly copper, lead and zinc) to make alloys. Arsenic compounds are also used in pigments, animal poisons, insecticides, paints, wallpaper, ceramics, and poison gases for chemical warfare, glass making, in calico and indigo printing, pyrotechnics, integrated circuits and transistors. Arsenic is also a major waste material from the gold mining industry.	Arsenic is not expected to be present in the areas within the subject buildings affected by the upcoming fire alarm system upgrade.	N/A
Acrylonitrile	Acrylonitrile is mostly used as a feedstock or chemical aid in the production of nitrile-butadiene rubber and in acrylonitrile-butadiene-styrene and styrene-acrylonitrile polymers. Acrylonitrile is also used to make other chemicals such as plastics, synthetic rubber, and acrylic fibre (e.g. clothing, blankets, carpeting) and nitrile rubber for oil-resistant hoses.	Acrylonitrile is not expected to be present in the areas within the subject buildings affected by the upcoming fire alarm system upgrade.	N/A

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Benzene	Benzene is widely used in the chemical industry as a starting material and solvent. Benzene occurs naturally in crude oil and is present in all gasoline products, automobile emissions and cigarette smoke. Benzene is highly volatile, and will release into the atmosphere over a short time.	Benzene is not expected to be present in the areas within the subject buildings affected by the upcoming fire alarm system upgrade.	N/A
Coke Oven Emissions	Coke oven emissions are complex mixtures of coal and coke particles, various vapors, gases and tars emitted during carbonization of coal to produce coke. The primary use of coke (pure carbon) is in the manufacture of iron and steel. Coke is also used to synthesize calcium carbide and to manufacture graphite and electrodes.	Coke oven emissions are not expected to be present in the areas within the subject buildings affected by the upcoming fire alarm system upgrade.	N/A
Ethylene Oxide	Ethylene Oxide is an extremely flammable gas used in the manufacture of several industrial chemicals including textiles, detergents, polyurethane foam, antifreeze (especially ethylene glycol), solvents, medicinal products, adhesives, and other related products. It is also used as a fumigant and as a sterilizing agent for food (spices), cosmetics, and surgical tool and plastic devices in hospitals as an alternative to steam.	Ethylene Oxide is not expected to be present in the areas within the subject buildings affected by the upcoming fire alarm system upgrade.	N/A

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Isocyanates	Isocyanates are the raw materials from which all polyurethane products are made. Isocyanates are widely used in the manufacture of flexible and rigid foams, fibres, coatings such as paints and varnishes, elastomers, and also in materials used in auto body repair and building insulation.	Isocyanates are not expected to be present in the areas within the subject buildings affected by the upcoming fire alarm system upgrade.	N/A
Vinyl Chloride	Vinyl chloride is the parent compound of polyvinyl chloride (PVC) which is a widely used plastic. Vinyl chloride is also used in various resins (e.g. plastic food wrap), and in the glass, rubber, and paper industries. Vinyl chloride is also formed by the degradation of the chlorinated solvents trichloroethylene (TCE), 1,1,1-trichloroethane (111TCA) and tetrachloroethylene (also known as perchloroethylene or dry cleaning solvent), especially in soil or groundwater that has been contaminated with these solvents.	Vinyl chloride is not expected to be present in the areas within the subject buildings affected by the upcoming fire alarm system upgrade.	N/A

5 LIMITATIONS

As this survey was generally non-destructive in nature, asbestos could be present in areas not accessible to the surveyors for identification. Contractors and maintenance personnel should be warned of the possibility of unidentified materials when breaking into enclosed areas. Suspect friable and non-friable building materials discovered in these areas should be treated as asbestos until proven otherwise. Materials equivalent or identical in description to those listed above should be considered to be ACM and handled appropriately.

This report is prepared for the sole use of the Client, who are responsible for its distribution to any third parties. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. The conclusions and recommendations contained in this assessment report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with currently accepted industry practices for asbestos surveys and regulatory requirements for sampling and identifying asbestos and are subject to the following inherent limitations:

1. The data and findings presented in this report are valid as of the date(s) of the investigation only. The passage of time, manifestation of latent conditions or occurrence of future events may warrant further exploration of the Site, analysis of the data, and re-evaluation of the findings, observations, and conclusions expressed in this report.
2. The findings, observations, conclusions, and recommendations expressed by WSP Canada Inc. in this report do not represent an opinion concerning compliance of any past or present owner or operator of the Site with any federal, provincial or local laws or regulations.
3. WSP Canada Inc.'s assessment presents professional opinions and findings of a scientific and technical nature. While attempts were made to relate the data and findings to applicable environmental and occupational health & safety laws and regulations, the report shall not be construed to offer legal opinion or representations as to the requirements of, nor compliance with, environmental and occupational health and safety laws, rules, regulations or policies of federal, provincial, or local governmental agencies. WSP Canada Inc. liability extends only to its client and not to other parties who may obtain this assessment report. Issues raised by the report should be reviewed by appropriate legal counsel.

APPENDIX

A

ANALYTICAL RESULTS – ASBESTOS & LEAD





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EMSL Canada Order 551801781
Customer ID: 55MMMG25
Customer PO: 181-02088-00
Project ID:

Attn: Stephen Heikkila
WSP Canada Group Limited
100 Commerce Valley Drive West
Thornhill, ON L3T 0A1
Phone: (905) 882-4211
Fax: (905) 882-1857
Collected: 2/13/2018
Received: 2/14/2018
Analyzed: 2/16/2018
Proj: 181-02088-00/Beaver Creek Institution

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: BC41-DJC-1A **Lab Sample ID:** 551801781-0001
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC41-DJC-1B **Lab Sample ID:** 551801781-0002
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC41-DJC-1C **Lab Sample ID:** 551801781-0003
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC25-DJC-2A **Lab Sample ID:** 551801781-0004
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC25-DJC-2B **Lab Sample ID:** 551801781-0005
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC25-DJC-2C **Lab Sample ID:** 551801781-0006
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC25-DJC-2D **Lab Sample ID:** 551801781-0007
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	



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EMSL Canada Order 551801781
Customer ID: 55MMMG25
Customer PO: 181-02088-00
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: BC25-DJC-2E **Lab Sample ID:** 551801781-0008
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC25-DJC-2F **Lab Sample ID:** 551801781-0009
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC25-DJC-2G **Lab Sample ID:** 551801781-0010
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC23-DJC-3A **Lab Sample ID:** 551801781-0011
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC23-DJC-3B **Lab Sample ID:** 551801781-0012
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC23-DJC-3C **Lab Sample ID:** 551801781-0013
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC23-DJC-3D **Lab Sample ID:** 551801781-0014
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC23-DJC-3E **Lab Sample ID:** 551801781-0015
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	



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Customer ID: 55MMMG25
Customer PO: 181-02088-00
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: BC23-DJC-3F **Lab Sample ID:** 551801781-0016
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC23-DJC-3G **Lab Sample ID:** 551801781-0017
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC24-DJC-4A **Lab Sample ID:** 551801781-0018
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC24-DJC-4B **Lab Sample ID:** 551801781-0019
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC24-DJC-4C **Lab Sample ID:** 551801781-0020
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC24-DJC-4D **Lab Sample ID:** 551801781-0021
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC24-DJC-4E **Lab Sample ID:** 551801781-0022
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC24-DJC-4F **Lab Sample ID:** 551801781-0023
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	



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EMSL Canada Order 551801781
Customer ID: 55MMMG25
Customer PO: 181-02088-00
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: BC24-DJC-4G **Lab Sample ID:** 551801781-0024
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC14-DJC-5A **Lab Sample ID:** 551801781-0025
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC14-DJC-5B **Lab Sample ID:** 551801781-0026
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC14-DJC-5C **Lab Sample ID:** 551801781-0027
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC14-DJC-5D **Lab Sample ID:** 551801781-0028
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC14-DJC-5E **Lab Sample ID:** 551801781-0029
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC14-DJC-5F **Lab Sample ID:** 551801781-0030
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC14-DJC-5G **Lab Sample ID:** 551801781-0031
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	



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EMSL Canada Order 551801781
Customer ID: 55MMMG25
Customer PO: 181-02088-00
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: BC20-DJC-6A **Lab Sample ID:** 551801781-0032
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC20-DJC-6B **Lab Sample ID:** 551801781-0033
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC20-DJC-6C **Lab Sample ID:** 551801781-0034
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC20-DJC-6D **Lab Sample ID:** 551801781-0035
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC20-DJC-6E **Lab Sample ID:** 551801781-0036
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC20-DJC-6F **Lab Sample ID:** 551801781-0037
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC20-DJC-6G **Lab Sample ID:** 551801781-0038
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC1-DJC-7A **Lab Sample ID:** 551801781-0039
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Tan	0%	100%	None Detected	



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Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: BC1-DJC-7B **Lab Sample ID:** 551801781-0040
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Tan	0%	100%	None Detected	

Client Sample ID: BC1-DJC-7C **Lab Sample ID:** 551801781-0041
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC1-DJC-7D **Lab Sample ID:** 551801781-0042
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC1-DJC-7E **Lab Sample ID:** 551801781-0043
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC1-DJC-7F **Lab Sample ID:** 551801781-0044
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC1-DJC-7G **Lab Sample ID:** 551801781-0045
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC1-DJC-8A **Lab Sample ID:** 551801781-0046
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC1-DJC-8B **Lab Sample ID:** 551801781-0047
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	



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Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: BC1-DJC-8C **Lab Sample ID:** 551801781-0048
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC1-DJC-8D **Lab Sample ID:** 551801781-0049
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC1-DJC-8E **Lab Sample ID:** 551801781-0050
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC1-DJC-8F **Lab Sample ID:** 551801781-0051
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC1-DJC-8G **Lab Sample ID:** 551801781-0052
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC10-DJC-9A **Lab Sample ID:** 551801781-0053
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC10-DJC-9B **Lab Sample ID:** 551801781-0054
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC10-DJC-9C **Lab Sample ID:** 551801781-0055
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	



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Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: BC13-DJC-10A **Lab Sample ID:** 551801781-0056
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-DJC-10B **Lab Sample ID:** 551801781-0057
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-DJC-10C **Lab Sample ID:** 551801781-0058
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-DJC-10D **Lab Sample ID:** 551801781-0059
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-DJC-10E **Lab Sample ID:** 551801781-0060
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-DJC-10F **Lab Sample ID:** 551801781-0061
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-DJC-10G **Lab Sample ID:** 551801781-0062
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-CP-11A **Lab Sample ID:** 551801781-0063
Sample Description: 2'x4' Ceiling Panel Large Fissures- Small Pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	80%	20%	None Detected	



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Client Sample ID: BC13-CP-11B **Lab Sample ID:** 551801781-0064

Sample Description: 2'x4' Ceiling Panel Large Fissures- Small Pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	80%	20%	None Detected	

Client Sample ID: BC13-CP-11C **Lab Sample ID:** 551801781-0065

Sample Description: 2'x4' Ceiling Panel Large Fissures- Small Pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	80%	20%	None Detected	

Client Sample ID: BC13-DJC-12A **Lab Sample ID:** 551801781-0066

Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-DJC-12B **Lab Sample ID:** 551801781-0067

Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-DJC-12C **Lab Sample ID:** 551801781-0068

Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-DJC-12D **Lab Sample ID:** 551801781-0069

Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-DJC-12E **Lab Sample ID:** 551801781-0070

Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-DJC-12F **Lab Sample ID:** 551801781-0071

Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	



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Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: BC13-DJC-12G **Lab Sample ID:** 551801781-0072
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC13-CP-13A **Lab Sample ID:** 551801781-0073
Sample Description: 2'x4' Ceiling Panel Small Fissures- Small Pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	80%	20%	None Detected	

Client Sample ID: BC13-CP-13B **Lab Sample ID:** 551801781-0074
Sample Description: 2'x4' Ceiling Panel Small Fissures- Small Pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	80%	20%	None Detected	

Client Sample ID: BC13-CP-13C **Lab Sample ID:** 551801781-0075
Sample Description: 2'x4' Ceiling Panel Small Fissures- Small Pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	80%	20%	None Detected	

Client Sample ID: BC12-FFP-14A **Lab Sample ID:** 551801781-0076
Sample Description: Grey Fireproofing Spray

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	55%	45%	None Detected	

Client Sample ID: BC12-FFP-14B **Lab Sample ID:** 551801781-0077
Sample Description: Grey Fireproofing Spray

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	55%	45%	None Detected	

Client Sample ID: BC12-FFP-14C **Lab Sample ID:** 551801781-0078
Sample Description: Grey Fireproofing Spray

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	55%	45%	None Detected	

Client Sample ID: BC12-FFP-14D **Lab Sample ID:** 551801781-0079
Sample Description: Grey Fireproofing Spray

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	55%	45%	None Detected	



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Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: BC12-FFP-14E **Lab Sample ID:** 551801781-0080
Sample Description: Grey Fireproofing Spray

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	55%	45%	None Detected	

Client Sample ID: BC12-FFP-14F **Lab Sample ID:** 551801781-0081
Sample Description: Grey Fireproofing Spray

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	55%	45%	None Detected	

Client Sample ID: BC12-FFP-14G **Lab Sample ID:** 551801781-0082
Sample Description: Grey Fireproofing Spray

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	Gray	55%	45%	None Detected	

Client Sample ID: BC05-DJC-15A **Lab Sample ID:** 551801781-0083
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC05-DJC-15B **Lab Sample ID:** 551801781-0084
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC05-DJC-15C **Lab Sample ID:** 551801781-0085
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC05-DJC-15D **Lab Sample ID:** 551801781-0086
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC05-DJC-15E **Lab Sample ID:** 551801781-0087
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	



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Client Sample ID: BC05-DJC-15F **Lab Sample ID:** 551801781-0088
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC05-DJC-15G **Lab Sample ID:** 551801781-0089
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-DJC-16A **Lab Sample ID:** 551801781-0090
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-DJC-16B **Lab Sample ID:** 551801781-0091
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-DJC-16C **Lab Sample ID:** 551801781-0092
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-DJC-16D **Lab Sample ID:** 551801781-0093
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-DJC-16E **Lab Sample ID:** 551801781-0094
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-DJC-16F **Lab Sample ID:** 551801781-0095
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	



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Client Sample ID: BC16-DJC-16G **Lab Sample ID:** 551801781-0096
Sample Description: Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-TC-17A **Lab Sample ID:** 551801781-0097
Sample Description: Ceiling Texture Coating

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-TC-17B **Lab Sample ID:** 551801781-0098
Sample Description: Ceiling Texture Coating

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-TC-17C **Lab Sample ID:** 551801781-0099
Sample Description: Ceiling Texture Coating

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-TC-17D **Lab Sample ID:** 551801781-0100
Sample Description: Ceiling Texture Coating

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-TC-17E **Lab Sample ID:** 551801781-0101
Sample Description: Ceiling Texture Coating

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-TC-17F **Lab Sample ID:** 551801781-0102
Sample Description: Ceiling Texture Coating

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	

Client Sample ID: BC16-TC-17G **Lab Sample ID:** 551801781-0103
Sample Description: Ceiling Texture Coating

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/16/2018	White	0%	100%	None Detected	



EMSL Canada Inc.

2756 Slough Street Mississauga, ON L4T 1G3
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<http://www.EMSL.com> / torontolab@emsl.com

EMSL Canada Order 551801781
Customer ID: 55MMMG25
Customer PO: 181-02088-00
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Analyst(s):

Anne Balayboa PLM (41)
Caroline Allen PLM (25)
Matthew Davis PLM (37)

Reviewed and approved by:

Matthew Davis or other approved signatory
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP of any agency of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 02/16/2018 15:06:30

**EMSL Canada Inc.**

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EMSL Canada Or	551801780
CustomerID:	55MMMMG25
CustomerPO:	181-02088-00
ProjectID:	

Attn: **Stephen Heikkila**
WSP Canada Group Limited
100 Commerce Valley Drive West
Thornhill, ON L3T 0A1

Phone: (905) 882-4211
 Fax: (905) 882-1857
 Received: 02/14/18 1:41 PM
 Collected:

Project: **181-02088-00****Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)***

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Weight</i>	<i>Lead Concentration</i>
BC25-Pb-01	551801780-0001 Site: Beige Paint		2/15/2018	0.2345 g	<85 ppm
BC23-Pb-02	551801780-0002 Site: Beige Paint		2/15/2018	0.2449 g	<82 ppm
BC14-Pb-03	551801780-0003 Site: Beige Paint		2/15/2018	0.2396 g	<83 ppm
BC18-Pb-04	551801780-0004 Site: White Paint		2/15/2018	0.2396 g	<83 ppm
BC13-Pb-05	551801780-0005 Site: Light blue paint		2/15/2018	0.2296 g	<87 ppm
BC05-Pb-06	551801780-0006 Site: Light blue paint		2/15/2018	0.2228 g	<90 ppm

Rowena Fanto, Lead Supervisor
 or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 02/16/2018 09:46:23

APPENDIX

B

SITE PHOTOGRAPHS





Photo #1: View of Building BC55 (Principle Entrance).



Photo #2: View of asbestos-containing parging cement located on pipe in the basement mechanical room (B01) in Building BC13 (Heath Services and SIS Building).



Photo #3: View of typical fire panel and water damage on drywall in the mechanical room of Building BC25 (Accommodation Unit #2).



Photo #4: View of water damage on drywall in the mechanical room of Building BC14 (Accommodation Unit #1).

APPENDIX

C

BACKGROUND AND PAST USES OF
DESIGNATED SUBSTANCES

BACKGROUND AND PAST USES OF DESIGNATED SUBSTANCES

Prior to the establishment and mainstream acknowledgement of the negative health consequences associated with human exposure to designated substances defined in the Act, these substances found use in an assortment of applications. The adverse health effects and common applications of substances regulated under the Act are summarized in this section.

ASBESTOS

Unlike other designated substances regulated under the act that are unimolecular (one chemical), asbestos is a term used to describe a group of minerals, all with long, thin fibrous crystals. In the late 19th century, asbestos maintained large popularity among the manufacturing and construction industries due to its resistance to heat, chemical and electrical damage, its sound absorption properties, tensile strength and affordability. These desirable characteristics resulted in the appearance of asbestos-containing materials (ACM) in construction products such as flat and corrugated sheets, pipes and shingles, vinyl flooring, linoleum, roofing felts, reinforced cement products, coatings and mastics and asbestos paper products. Asbestos' thermal insulating properties resulted in its appearance in sprayed insulation and fireproofing for steel structures, often in high relative ratios. Its capacity to absorb both heat and acoustic energy prompted its use as thermal/acoustic insulation for pipes and boilers. The three most prevalent and widely used types of asbestos were; 1) chrysotile; 2) amosite, and; 3) crocidolite.

In the early 1970s, the use of asbestos products declined sharply due to increasing concerns raised over the material's health effects. By mid-1979, the specific prohibition and the availability of safer alternatives largely put an end to the use of many asbestos products.

Due to the extensive use of ACM in the construction industry over a period of approximately 50 years, the concern over the possibility of individuals being exposed to ACM is a legitimate one. It has been shown that inhalation of asbestos fibres at high concentrations or over extended periods of time can cause asbestosis, lung cancer or mesothelioma. However, it has been well established that, unless damaged or disturbed, satisfactorily encapsulated ACM does not pose a hazard to worker or employee health and safety.

LEAD

Lead is a heavy metal that has been used by humans in industrial applications for several millennia. Lead may be used in its pure metallic form or combined chemically with other elements to form lead compounds. Inorganic lead compounds (lead salts) result when lead forms an ionic bond with atomic or polyatomic anions, examples of which include lead oxide, lead chromate, lead carbonate and lead nitrate.

Inorganic lead compounds may exist in either the solid or liquid state and have found use in applications such as insecticides, pigments, paints, glasses, plastics and rubber compounds. Lead was used as a primary ingredient in many interior and exterior oil-based paints from the early 1900s to the late 1970s. Interior or exterior paints produced after 1970 may however; still contain small amounts of lead. Lead can enter the human body through all known mechanisms of toxicological exposure; inhalation, ingestion and dermal absorption. The toxicological dynamics and kinetics of lead are such that no amount of lead exposure is safe. Worker exposure to lead in the form of a high dose sustained over a short time period or after chronic exposure to low doses can both result in severe adverse health effects.

Lead dust is a particular hazard in buildings. Lead conjugated particulate has been documented to be aerosolized in facilities that house applications such as rifle/gun ranges or industrial processes such as sanding, cutting or grinding of lead-containing materials.

SILICA

Silica has found use in a variety of applications, including: sandblasting; abrasive grinding and scouring, resin, moulds casting and glass manufacturing and in processes related to the production of electronic components and fibreglass.

The prolonged inhalation of dust containing free crystalline silica results in a disease known as silicosis. Silicosis is a pneumoconiosis (a lung disease caused by the inhalation of dust) and is characterized by progressive fibrosis of the lungs and marked by shortness of breath, impaired lung function and subsequent complications that sometimes result in death. In the construction sector, silica (as common sand) is a major ingredient of concrete and cement products such as masonry and mortar. Concern over silica's adverse health effects are raised when silica becomes respirable for two reasons; 1) smaller silica particles

can more deeply permeate into the lungs, resulting in a higher capacity for the material to cause adverse damage on a per mass basis and; 2) these smaller sized particles are more easily aerosolized than their larger, non-respirable counterparts. Processes such as cutting, abrading, and drilling of concrete and other sand-containing materials creates respirable silica-containing dust that has the potential to be inhaled by workers who do not use appropriate protective measures and personal protective equipment.

MERCURY

Mercury is a silver-coloured metal that exists in the liquid state at room temperature. Mercury has been and is currently used in commercial applications as both a pure metal and in metallic, chelated compounds. The greatest use of elemental mercury in Ontario is in electrical equipment such as silent switches. Small amounts of mercury compounds are present in fluorescent tubes and mercury vapour lamps, older thermostats and paints.

OTHER DESIGNATED SUBSTANCES

ETHYLENE OXIDE is used in the pharmaceutical industry and by hospitals as a disinfectant of plastic items that cannot be autoclaved.

ISOCYANATES are a class of chemicals used in the manufacture of certain types of plastics, foams, coatings and other products.

ACRYLONITRILE is a clear, (colourless or yellow) liquid that is explosive, flammable and toxic. It is used as a polymer or resin in the production of rubbers, coatings and adhesives.

COKE OVEN EMISSIONS are the benzene-soluble fraction of total particulate matter produced by the destructive distillation or carbonization of coal for the production of coke.

BENZENE is a clear, colourless and highly volatile organic solvent. It is used in a tremendous number of processes in chemical laboratories and within the chemical industry and is demonstrated to be highly carcinogenic.

ARSENIC is a metalloid used to harden copper, lead and other alloys, in the manufacture of electronics and glass and in numerous other applications. Its mechanism of toxicity is via the arrest of cellular respiration and can be absorbed via ingestion, inhalation or dermal absorption.

VINYL CHLORIDE is a colourless gas with a sweet odour that is used in the manufacture of various products in the building and construction sectors, including the automotive industry, electrical wire insulation, cables, piping, industrial and household equipment, and medical supplies. The carcinogenicity of this substance has been widely established.

OTHER HAZARDOUS MATERIALS

POLYCHLORINATED BIPHENYLS (PCB) have been synthetically manufactured on a commercial basis since 1929. They have never been manufactured in Canada, with the entire supply coming from the USA. By the late 1960s, the toxic effects of PCBs started to gain recognition, as did its bio-accumulative properties, as significant levels of PCBs were being detected within species throughout the world's most remote environments. Throughout the 1970s, the manufacture of PCBs was phased out; however considerable amounts remain in use.

PCBs were commonly used in electrical equipment because of their excellent electrical and fire-resistant properties. For a considerable period of time, Askarels (a mixture of chlorobenzenes and PCBs) were the coolants of choice for indoor transformers. Many outdoor transformers with mineral oil coolant became contaminated with PCBs during manufacture or servicing. PCBs were also used in a variety of other products including heat transfer fluids, lubricants, plasticizers, inks, dyes, pesticides and adhesives.

OZONE-DEPLETING SUBSTANCES (ODS) such as halocarbons are synthetic, organic compounds that containing halogen species, namely fluorine, chlorine, and bromine. These substances have either been classified into groups based on chemical structure (such as the fluorocarbons, the halons, the chlorofluorocarbons (CFCs), and the hydrochlorofluorocarbons (HCFCs) or are molecules that cannot be grouped into such classifications on the basis of their physical/chemical properties (such as carbon tetrachloride, methyl chloroform, and methyl bromide). Canadian environmental legislation aimed at prohibiting the release of these substances is in effect, as they are known contributors to ozone depletion.

ODS-based solvents (particularly CFCs and HCFCs) have found general use in numerous domestic, commercial and industrial applications. Halocarbons are used primarily as a refrigerant and as a blowing agent in foam product manufacturing. In buildings, ODSs are commonly found in refrigeration systems, halon fire extinguishers and air conditioning systems.

UREA FORMALDEHYDE FOAM INSULATION (UFFI) is a solid product that was used in buildings (particularly residential dwellings) as injectable insulation, often in cases where it was otherwise impractical to provide conventional insulation. UFFI was used extensively throughout the 1970s, with particular usage between 1975 and 1978, the time period during which the Canadian Home Insulation Program, a financial incentive program to encourage home insulation upgrades administered by the federal government, was in effect. The insulation was approved for use in Canada in exterior wood-frame walls only and was banned for use in 1980.

UFFI contains formaldehyde, which in a non-vapour state, is not believed to cause adverse health effects in humans. Concerns regarding the safety of UFFI were raised when it became known that the material has the capacity to release formaldehyde gas, a well-known probable human carcinogen. As a solid product, UFFI is considered to be safe for human contact. However, upon initial application of the foam, small amounts of formaldehyde may be released to the air. Given that there is a finite amount of formaldehyde available for off-gassing, the rate of formaldehyde release from the foam declines steadily as time progresses. Studies have shown that within two years of application, half of the available formaldehyde has been released.

OTHER CHEMICALS AND WASTES include potentially toxic substances that may exist at the subject building. These may include water treatment chemicals associated with heating and cooling systems, heating fuels, building maintenance supplies such as paint and paint stripper, building cleaning supplies containing chemicals such as sodium hypochlorite and ammonium hydroxide and pesticides. In line with the objectives of this assessment, efforts were made to identify whether substances were in use, are present for intended future use or have become obsolete. It is recommended that; 1) the health and safety information of those substances identified as having use at the subject facility be reviewed in order to ensure that they appropriately stored and handled and; 2) wastes be gathered at a central location, classified and disposed of in accordance with the applicable regulatory requirements.

APPENDIX

D

PSPC ASBESTOS MANAGEMENT
STANDARD (2017)





Title: Asbestos Management Standard

1. **Effective date:** June 5, 2017

2. Authority

This standard is issued under the authority of the Assistant Deputy Minister (ADM), Real Property Branch (RPB), Public Services and Procurement Canada (PSPC).

3. Context

This standard enhances and supplements Part II of the *Canada Labour Code - Occupational Health and Safety*, as well as the *Canada Occupational Health and Safety Regulations* (COHSR) Part X - Hazardous Substances, subsection 10.19 Control of Hazards, and should be read in that context.

This standard should also be read in conjunction with the National Joint Council *Occupational Health and Safety Directive*, Part XI - Hazardous Substances, and the PSPC *Standard on Hazardous Substances*, which is part of the departmental occupational health and safety policy suite.

4. Scope

This standard applies to buildings and engineering assets, both Crown-owned and leased (including lease-purchase, and sale leaseback), where PSPC is the custodian, in which either:

- asbestos-containing material has been found to be present; or
- no professional certification attesting that the building does not include any known asbestos-containing material can be obtained.

This includes buildings and engineering assets that are managed internally, as well as those managed on behalf of PSPC by real property contractors.

5. Purpose

This standard sets out Real Property Branch's requirements regarding the operational and technical activities required to be carried out for the management of asbestos-containing material.

6. Details on Asbestos Management, Maintenance and Repair Work Processes

Each building that contains asbestos-containing material shall have in place an Asbestos Management Plan that must be kept onsite, and be available to building systems technicians, building operator maintainers, and service providers through the Asset Manager, or Property and Facility Manager, as well as departmental employees through the Employer representatives. Annual reassessment of asbestos-containing material, work records, and sampling results must be part of the Asbestos Management Plan.

An Asbestos Management Plan is required for all buildings unless a professional certification confirming that the building does not include any known asbestos-containing materials is obtained. The certification must be kept onsite and be available to all building occupants upon request.

The asbestos management requirements for leased buildings are subject to the existing lease clauses, in addition to the requirements named in this standard.

Processes regarding the contents and preparation of the Asbestos Management Plan are provided in Section 6.1, Asbestos Management Plan.

Maintenance and renovation work performed in a building known to contain asbestos-containing material shall be conducted as per the processes outlined in Section 6.2, Maintenance, renovations and construction processes involving asbestos-containing materials.

6.1. Asbestos Management Plan

6.1.1. Background information

An Asbestos Management Plan is required to ensure that asbestos-containing material is managed and controlled in PSPC custodial buildings and engineering assets, both Crown-owned and leased (including lease-purchase, and sale leaseback), to reduce the risk of damaging asbestos-containing material, and potential occupant exposure to airborne asbestos fibers. The Asbestos Management Plan is to be reviewed and updated to reflect changes in policy and regulations at least every 5 years, or more frequently if required. Whenever reviewed or updated, the Asbestos Management Plan must be provided to the Employer representatives and retained in accordance with section 6.2.11. A record must be kept reflecting when and to whom the report was presented.

The Asbestos Management Plan performs the following functions:

- At the building level, it is a central repository of all information related to the management of asbestos for each facility.
- It acts as a control mechanism to ensure compliance.
- It communicates roles and responsibilities of those required to work with or around asbestos-containing materials.
- It describes work classification for disturbances of asbestos-containing materials.

- It communicates the departmental processes for working with asbestos-containing materials.
- It acts as common terms of reference for the safe operation and management of a building or engineering asset with asbestos-containing materials.

The Asbestos Management Plan includes the following elements at a minimum:

- a list of applicable regulatory requirements
- a brief summary of locations and types of material that contain asbestos present in the building
- a survey and inventory of asbestos-containing materials, and assessment of material condition
- annual asbestos-containing material reassessment
- notification of location, quantity, and condition of asbestos-containing materials and the potential for disturbance
- training and awareness requirements
- notification of Employer representatives when work will be performed that disturbs asbestos
- repair and maintenance procedures
 - classification
 - sample collection and analysis
 - processes
 - project inspection
 - air monitoring
- emergency work procedure(s)
- laboratory results for all materials tested (to be included whether samples are positive or negative for asbestos content)

6.1.2. Crown-owned Buildings and Engineering Assets' asbestos-containing material inspection, assessment, and inventory

6.1.2.1. Inspection

In order to determine the presence of asbestos-containing material in buildings and engineering assets, and to ensure the maintenance of a complete inventory of asbestos-containing materials, an initial baseline survey must be completed by a qualified person on all buildings and engineering assets which have the potential to contain asbestos. An annual reassessment must be performed by a qualified person on all asbestos-containing materials identified in the baseline asbestos survey, and on those materials which may have subsequently been identified during maintenance, renovations, or other construction activities at the site.

The baseline survey must include:

- identification, location, condition, accessibility, and quantity of suspected and confirmed friable and non-friable asbestos-containing material; and

- an action matrix (as described in Annex A, Section 1.4.3.), which establishes recommended asbestos control action(s).

Any material suspected of containing asbestos must have its status confirmed through laboratory analysis; until confirmed, it is assumed to be asbestos-containing material.

6.1.2.2. Laboratory material analysis

The collection of material samples shall be carried out as randomly-collected bulk samples, and be representative of the homogeneous surfaces, areas, and types of material present. Samples are to be collected following the procedures outlined in Section 6.2.6.

The analysis of bulk samples shall be performed by a laboratory accredited by either the National Voluntary Laboratory Accreditation Program (NVLAP), American Industrial Hygiene association (AIHA), or the Canadian Association for Laboratory Accreditation (CALA), or using a method noted in provincial regulations where the sample was taken, to the detection limits specified in Annex A, Section 1.2. Frequency of sample collection must meet federal/provincial/territorial regulations, but can be more frequent at the discretion of the surveyor.

Analysis of bulk samples are to be performed, where possible, using the United States Environmental Protection Agency method EPA/600/R-93/116 for Polarized Light Microscopy (PLM). In some instances, analysis must be performed using Transmission Electron Microscopy (TEM) (an example of this would be analysis of vinyl floor tile).

6.1.3. Assessment of asbestos-containing materials

Asbestos-containing materials that are identified as a result of the survey and laboratory analysis shall be assessed for their condition and accessibility. Annex A - *Evaluation of Asbestos-Containing Materials and Recommendations for Control*, provides specific criteria for the assessment of asbestos-containing materials based on condition and accessibility, as well as mandatory Asbestos Management Program response(s) relative to health risk. It also provides an action matrix, which is used to determine the recommended action to control asbestos-containing materials based on the particular circumstances. Detailed information regarding the requirements to properly undertake each action is also provided.

6.1.4. Inventory of asbestos-containing materials

An inventory of asbestos-containing materials must be maintained, and the inventory shall contain information for the specific building or engineering asset. The inventory record shall remain in the building or engineering asset. The inventory shall contain a list of all known asbestos-containing materials and their locations. If access to an area is not permitted due to security or other reasons, it will be noted in the inventory.

In general, inventories are in table format and include the following:

- type of building material that contains asbestos (example: floor tile)
- asbestos location
- asbestos type and percent content (example: amosite 3%)

- asbestos friability (friable or non-friable)
- quantity of building material
- asbestos condition
- accessibility of the asbestos

Floor plans indicating the location(s) of asbestos-containing materials may be included.

It must be ensured that a copy of the current inventory is maintained onsite at a location that is accessible, and provided to the Employer representatives, and facility maintenance staff.

6.1.5. Annual asbestos-containing material reassessment

On a yearly basis, the building or engineering asset's asbestos-containing material inventory information is to be updated through a reassessment based primarily on change in condition and quantity (refer to Annex B), and outdated versions of the inventory records must be archived and retained in accordance with section 6.2.11. The Asbestos Management Plan shall be updated with new inventory information as changes are made at the various locations, or where new information identifies the existence of asbestos-containing material not previously identified.

The reassessment must be signed by, and conducted under the direction of, a person qualified in asbestos management. The results of this assessment are to be added to the building Asbestos Management Plan as described in section 6.1.1.

In a timely fashion, the annual re-assessment, along with a summary of the report in plain language, must be provided to the Employer representatives and Regional Asbestos Coordinator. A record must be kept reflecting when and to whom the report was presented.

6.1.6. Leased Space

If a building is known to contain asbestos-containing materials, then before leased space is occupied, an Asbestos Management Plan must be obtained from the Lessor that identifies all friable and non-friable asbestos-containing materials located within the building and on the property. Otherwise, a professional certification confirming that the building does not include any known asbestos-containing materials is required.

The Asset Manager, or Property and Facility Manager will keep an electronic copy of the Asbestos Management Plan available to be distributed upon request.

For detail on lease clauses, refer to *PWGSC's Invitation to Offer document*, owned by the Real Estate Services Service Line.

6.2. Maintenance, renovations and construction processes involving asbestos-containing materials

6.2.1. Classification of asbestos-related work

The following criteria shall be used in determining the classification of asbestos work.

6.2.1.1. Low risk work

Low risk work includes:

- non-destructive (i.e. without breaking, cutting, drilling, abrading) removal of non-friable asbestos-containing material;
- destructive work (i.e. breaking, cutting, drilling, abrading) on wetted non-friable asbestos-containing material with non-powered hand-held tools;
- removal of one square meter or less of drywall in which joint compounds contain asbestos-containing materials;
- removal or replacement of 7.5 square metres or less of asbestos-containing compressed-mineral-fibre-type ceiling tiles; and
- collecting samples of materials suspected of containing friable asbestos.

6.2.1.2. Intermediate risk work

Intermediate risk work includes:

- entry into ceiling spaces, crawlspaces, pipe tunnels, etc., where friable asbestos debris is or may be present;
- removing more than 7.5 square meters of asbestos-containing suspended ceiling tiles;
- removal of more than one square metre of drywall where asbestos-containing joint compound materials has been used;
- destructive work (i.e. breaking, cutting, drilling, abrading) on non-wetted, non-friable asbestos-containing material with non-powered hand held tools;
- destructive work (i.e. breaking, cutting, drilling, abrading) on non-friable asbestos-containing material if the work is done by means of power tools that are attached to dust collecting devices equipped with a high efficiency particulate air (HEPA) filters;
- minor removal or disturbance of friable asbestos-containing material. Minor is defined as follows:
 - in British Columbia: up to 0.1 m² surface area, or 3 linear metres of pipe insulation
 - in Quebec: up to 0.03 m³ of debris
 - all others: up to 1 m² of surface area
- enclosing friable asbestos-containing material;
- applying tape or cover to asbestos-containing insulation;
- glove bag removal of asbestos-containing material from a pipe, duct or similar structure;
- removing filters in an air handling unit in a building that has sprayed-on asbestos-containing fireproofing; and
- work not otherwise classified as either low or high risk.

6.2.1.3. High risk work

High risk work includes:

- major removal or disturbance of friable asbestos-containing material (greater than quantities defined under intermediate work);

- destructive work (i.e. breaking, cutting, drilling, abrading) of non-friable asbestos-containing material using power tools not attached to dust-collecting devices equipped with HEPA filters;
- encapsulating friable asbestos-containing material by spray application of an encapsulant or sealant;
- cleaning or removal of ductwork and air handling equipment serving or passing through areas of buildings with sprayed, friable asbestos-containing material; and
- repair, alteration or demolition of a boiler, furnace, kiln, or similar equipment made of asbestos-containing refractory materials.

6.2.2. Asbestos work processes

Written processes for performing low, intermediate, and high risk work are to be developed for the work to be undertaken, based on the friability of the asbestos-containing material, processes to be used, and the worksite. These processes shall be developed in accordance with the *Canadian National Master Construction Specification (NMS)*, Sections 02 82 00.01 (Asbestos Abatement - Minimum Precautions), 02 82 00.02 (Asbestos Abatement - Intermediate Precautions), or 02 82 00.03 (Asbestos Abatement - Maximum Precautions).

6.2.3. Notification

Written notification must be given to the Asset Manager, or Property and Facility Manager of the potential disturbance of asbestos-containing materials during repair, maintenance and construction projects.

6.2.4. Control prior to maintenance work

All maintenance work shall be reviewed for the possibility of disturbance of asbestos-containing material when work is required.

Before undertaking any work that may disturb asbestos-containing materials, a report shall be prepared stating the type(s) of asbestos and the condition of the asbestos-containing material, and the location of the asbestos-containing material.

When there are friable or non-friable asbestos-containing materials in the work area and this material will be disturbed by the work, then the work shall be considered asbestos-related work, and the risk level classified by a qualified person in accordance with the work to be performed.

Prior to the start of work, the Asset Manager, or Property and Facility Manager will inform the Employer representatives.

Arrangements shall be made for specifications to be prepared for asbestos work by a qualified person, following the appropriate specifications according to *Canadian National Master Construction Specification (NMS)* format mentioned in Section 6.2.2. Alterations to specifications, in order to accommodate specific federal and provincial requirements, shall be determined based on work requirements.

When there are asbestos-containing materials in the maintenance area, and it has been determined that these materials could be disturbed by the work, the maintenance staff or the service provider must be notified.

Before asbestos abatement work is started, the following documentation must be provided by the service provider as proof of competency as per provincial/territorial regulations:

- third-party liability insurance
- fit test certificate
- service provider's site-specific safety plan
- Notice of Project
- copy of Workplace Safety and Insurance Board / Ministry of Labour clearance
- copy of trade certificates / competency cards
- other certificates where required (fall protection, confined space, man lift, etc.)

Also prior to the commencement of asbestos abatement work, the following precautions must be ensured:

- management has received proof of adequate training for employees performing asbestos work and approved personal protective equipment is provided;
- containers for asbestos waste shall be labeled as asbestos waste and are held at a pre-determined, secure location in the building; and
- the collection and disposal of asbestos-containing material waste is performed in accordance with the applicable provincial regulations.

In the event of a suspected release of asbestos-containing material outside of the contained work area, the processes detailed in the building Asbestos Management Plan concerning emergency work procedures must be complied with.

6.2.5. Control prior to renovation and construction work

Prior to commencement of projects that include the demolition of material suspected of containing asbestos which has not yet been tested (such as material not accessible in the original survey), testing of this material for asbestos shall be undertaken, unless previous comprehensive testing in the building has shown this material to be free of asbestos. Along with the asbestos surveys of the building, records of test results shall be maintained on site as per Section 6.2.11.

When there are friable or non-friable asbestos-containing materials in the work area and this material will be disturbed by the work, then the work shall be determined as asbestos-related work and the risk level classified by a qualified person in accordance with the work to be performed.

In a timely fashion, a summary report, written in plain language, concerning the asbestos work must be provided to the Employer representatives. A record must be kept reflecting when and to whom the report was provided.

Arrangements shall be made for specifications to be prepared for asbestos work by a qualified person, following the appropriate *Canadian National Master Construction Specification (NMS)* format mentioned in Section 6.2.2. Alterations to specifications, in order to accommodate specific federal and provincial requirements, shall be determined based on work requirements.

Services related to the design and preparation of specifications shall be performed by a qualified person with the appropriate training, experience, and insurance for asbestos-related work.

When there are asbestos-containing materials in the renovation area, and it has been determined that these materials could be disturbed by the work, the maintenance staff and/or the service provider must be notified of the presence of asbestos-containing material.

Prior to the start of asbestos abatement work, documentation and work precautions must be ensured as per section 6.2.4.

In the event of a suspected release of asbestos-containing material outside of the contained work area, the processes detailed in the building Asbestos Management Plan concerning emergency work procedures must be followed.

Upon completion of any project work which alters the amount or condition of asbestos-containing material in the building or engineering asset, a report will be prepared that indicates the work that has been completed. The inventory shall be updated, and this information is to be retained in accordance with Section 6.2.11.

6.2.6. Bulk sample procedures

During the annual reassessment or investigation prior to renovation projects, material may be discovered that could contain asbestos. The only way to confirm the presence of asbestos is by means of laboratory testing. In order to establish whether there are any asbestos-containing materials, and to identify the type and concentration of asbestos, bulk material samples must be collected by a qualified person from a homogeneous surface, area or insulation. The information gathered is essential in ensuring proper identification of asbestos materials by microscope analysis. Bulk material sampling is conducted as follows:

1. The material must be sampled when the area is not in use where feasible. Only those persons needed for sampling should be present in the immediate area.
2. The use of a National Institute for Occupational Safety and Health (NIOSH) approved respirator is recommended for all sampling. Depending on the condition and location of the material, airborne fibres can be generated during sampling.
3. Under the work area, polyethylene drop sheet must be placed over flooring that absorbs dust (such as carpeting) and over flooring in the asbestos work area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.

4. The material is to be sprayed with a light mist of water to prevent asbestos fibre release during sampling, if possible. The material must not be disturbed any more than necessary.
5. Materials of different appearance should be sampled separately. Mechanical insulation must be sampled separately on all systems, tanks, vessels, etc. Both the straight sections of pre-formed insulation, and the insulating cement typically present at elbows, fittings, etc. (unless visually identified as fibreglass) must be sampled. Frequency of sampling must meet federal/provincial/territorial regulations.
6. For asbestos insulation, the sample is collected by penetrating the entire depth of the material, as the insulation may have been applied in more than one layer or covered with paint or other protective coating.
7. If pieces of material break off during sampling, the contaminated area must be cleaned up by wet cleaning. Any debris generated must be placed in plastic bags, labelled, sealed and disposed of as asbestos waste in accordance with requirements of the provincial/territorial and/or federal authority having jurisdiction.
8. Samples must be placed in labeled plastic bags with a zip-lock closure or in sealed plastic vials. Samples shall be identified with the following information:
 - sample number
 - location (e.g. building name, room number)
 - date of sampling
 - name of sampler
 - source of sample, e.g. cold water pipe, cold water fitting, etc.
9. Any openings created to collect the sample must be sealed (e.g. self-adhesive tape, paint or metal-foil tape to be wrapped completely around the pipe, duct or structure).
10. Bulk sample analysis shall be done by an accredited laboratory (refer to Section 6.1.2.2, Laboratory material analysis).
11. The minimum number of bulk material samples to be collected for each type of test material is 3. When sampling homogeneous materials such as plaster, or materials applied by troweling, 5 samples are required when the area is greater than 90 square meters, 7 samples are required when the area exceeds 450 square meters.

6.2.7. Respirator fitting, inspection and maintenance

For matters pertaining to respiratory protection, refer to the departmental *Procedure on Respiratory Protection* which is under the *Standard on Personal Protective Equipment and Clothing for Employees*.

6.2.8. Asbestos work inspection and air quality monitoring

6.2.8.1. Low risk work

Work classified as low risk shall be subject to the standard maintenance or project inspection requirements, ensuring all asbestos-containing material has been removed and the area cleaned of dust and debris. Air monitoring is not required during or after work.

6.2.8.2. Intermediate risk work

Work classified as intermediate risk shall be inspected by a qualified person during the work. Air monitoring for total fibre concentration outside of work areas will be conducted adjacent to the work area daily by a qualified person. Upon completion of work, with acceptable results attained by the inspection and air monitoring, asbestos precautions in the area are no longer required.

The air samples will be analyzed by phase contrast microscopy as determined by NIOSH Method 7400, or an equivalent under provincial regulations. Analysis of samples shall be performed by organizations participating in a recognized external quality control program. A stop-work order will be issued when phase contrast microscopy measurements of the air samples exceed 0.05 fibres/cm³. This order is in effect until work processes are corrected and subsequent tests are less than 0.05 fibres/cm³.

6.2.8.3. High risk work

Arrangements shall be made for a qualified person to inspect and perform daily air monitoring for total fibre concentration outside of work areas classified as high risk. If required, additional monitoring shall be performed to meet provincial/territorial regulations.

The air samples are to be analyzed by phase contrast microscopy as determined by NIOSH, Method 7400, or an equivalent under provincial regulations. Analysis of samples shall be performed by organizations participating in a recognized external quality control program. A stop-work order will be issued when phase contrast microscopy measurements of the air samples exceed 0.05 fibres/cm³. This order is in effect until work processes are corrected and subsequent tests are less than 0.05 fibres/cm³.

All high risk removal projects shall be subject to final clearance air testing. The clearance criterion shall be a concentration of less than 0.01 fibres per cubic centimetre (fibres/cm³) of air, as determined by NIOSH, Method 7400, or an equivalent under provincial regulations. If any sample does not pass the phase contrast microscopy test, samples shall be further analyzed via transmission electron microscopy following NIOSH Method 7402.

6.2.9. Hazardous occurrence investigation and reporting

When a building occupant is, or may have accidentally been, exposed to airborne asbestos as a result of disturbance of asbestos-containing material, or by inadvertent contact during regular maintenance, renovation or construction work, a qualified person shall be appointed to conduct a hazard investigation as defined by the *Canada Occupational Health and Safety Regulations*.

The assessment shall determine the potential hazard, and must conclude as to whether the hazardous material could be present as an airborne hazard, at a level of at least 50% of the exposure limit as determined by the threshold limit values identified by the American Conference of Governmental Industrial Hygienists (ACGIH). The Asset Manager or Property and Facility Manager, building Employer representatives, and the Workplace Health and Safety Committee must be invited to participate in the assessment. At the conclusion of the assessment, all participants will receive a copy of the Hazardous Occurrence Investigation report.

When airborne asbestos-containing materials are likely present at level of at least 50% of the exposure limit, a control plan shall be instituted. The control plan must address the following:

- a record of where asbestos-containing material was found
- written procedures for control
- a communication plan with building Employer representatives
- medical surveillance, when applicable
- training of employees

6.2.10. Emergency work procedures

A building’s Asbestos Management Plan outlines emergency work procedures.

6.2.11. Records

Records shall be kept in accordance with the following:

Document	Length of retention – electronic copy	Information on site
Annual record of inspection	30 years (including beyond the life of the building / disposal of the building / building no longer managed by PSPC)	Most recent copy
Asbestos Management Plan	30 years (including beyond the life of the building / disposal of the building / building no longer managed by PSPC)	Most recent copy
Asbestos Containing Materials inventory	30 years (including beyond the life of the building / disposal of the building / building no longer managed by PSPC)	Most recent copy
Test results (air and bulk sampling)	30 years (including beyond the life of the building / disposal of the building / building no longer managed by PSPC)	Most recent copy
Medical test records	30 years from date of test - Refer to human resources document storage requirements	Refer to human resources requirements

In addition, for records noted above to be kept on site, these shall be retained on site as long as a building is occupied or managed by PSPC. For electronic copies (other than medical

records), these records shall be saved and retained in GCDOCS as per the above retention schedule, and managed subject to any instructions for a hazardous substances information management system.

All other documents related to asbestos management and abatements shall be maintained and disposed of as per PSPC's departmental policy *Records Management and Information Holdings (044)*, and the associated Departmental Records Retention and Disposal Plan.

7. Definitions

Asbestos: naturally occurring fibrous silicates, including chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

Asbestos containing material (ACM): any material found to contain asbestos that is at or above the limit defined by provincial standards, as determined by the standard Polarized Light Microscopy (PLM) or Transmission Electron Microscopy (TEM) methods for the analysis of bulk samples.

Asbestos-related work: work that will disturb friable or non-friable asbestos-containing material in the area.

Asbestos work area: area where work is being performed which will or may disturb asbestos-containing material, including overspray and fallen material or settled dust that may contain asbestos.

Assets and facilities for which PSPC is the custodian: any federal real property or federal immovable acquired or leased by the Department for the purposes of the Department under the administration of the Minister of Public Services and Procurement.

Construction: any work or undertaking in connection with a project, including, but not restricted to, erection, alteration, repair, dismantling, demolition, structural maintenance, painting, land clearing, earth moving, grading, excavating, trenching, digging, boring, drilling, blasting or concreting; the installation of any machinery or plant; and ship repair/maintenance when in dry dock.

Custodian: a department whose minister has administration of real property for the purposes of department or agency programs, or for the accommodation of other federal departments and agencies.

Department: Public Service and Procurement Canada (PSPC)

Employee: a person employed in the part of the public service to which the Public Service Commission has exclusive authority to make appointments; this includes students and part-time employees and casual workers.

Employer: a person who employs one or more employees, and includes an employer's organization and any person who acts on behalf of an employer.

Employer representative: a person who acts on behalf of the employer department, as designated by the department. This means that each department located in a building has a representative who communicates with his or her department's Workplace Health and Safety Committee, in compliance with the *Canada Labour Code*, Part II.

Encapsulation: application of a liquid sealant to asbestos-containing material; the sealant may penetrate and harden the material, or cover the surface with a protective coating (bridging sealants). Also called encasement.

Enclosure: a structure made of polyethylene or other suitable material to prevent the spread of asbestos containing material from the work area.

Friable asbestos product: asbestos-containing material that, when dry, can be crumbled, pulverized or powdered by hand pressure. This definition also includes dust or debris arising from non-friable materials that are, or will become, crumbled, pulverized or powdered, i.e. asbestos-containing plaster disturbed by demolition.

Glove bag removal: a method of removing friable insulation from a piping system using a prefabricated bag which isolates the section of insulation being removed.

Hazard: any source of potential damage, harm or adverse effects on life, health, property or environment at work. It refers to any biological, chemical, ergonomic, physical, psychosocial or safety factor that is reasonably likely to cause harm or damage to humans, other organisms, or the environment in the absence of its control. Sometimes a hazard is referred to as being the actual harm or the health effect it caused rather than the hazard. For example the disease tuberculosis might be called a hazard by some but in general the tuberculosis-causing bacteria would be considered the "hazard" or "hazardous biological agent". Exposure to tuberculosis would be the hazardous incident.

Hazardous occurrence: an event occurring at a PSPC-managed building or worksite, or through the course of an employee's work, that results in, or has the potential to result in, a fatality, injury, illness, exposure to a hazardous substance or property damage, or an escapement of a hazardous material. For the purpose of investigating, recording and reporting hazardous occurrences, the following are included under this term: disabling injuries, minor injuries and near-misses.

Hazardous substance: a controlled product that is a chemical, biological or physical agent that, by reason of a property that the agent possesses, is hazardous to the safety or health of a person exposed to it.

Investigation: act or process of a qualified person investigating a hazardous occurrence; a careful search or examination in order to discover facts, identify the root cause and contributing factors to produce a report of corrective measures.

Manager: an employee who forms part of a management team and is accountable for exercising delegated authority over human and financial resources to accomplish the objectives of the organization.

Personal protective equipment: any clothing, equipment, or device worn or used by a person to protect that person from injury or illness, and to minimize exposure to specific occupational hazards.

Professional certification: a document which has been validated by the signature of a person formally certified by a professional body.

Qualified person: a person who:

- has the required knowledge, training and experience to organize the work and its performance;
- is familiar with all legislation and regulations that apply to the work; and
- has knowledge of any potential or actual danger to health or safety in the workplace.

Examples of a qualified person include a Professional Engineer, Industrial Hygienist, or someone who has another professional designation for the purposes of this standard that are related to asbestos management.

Risk: for the purposes of this document, the potential for harm befalling an individual, given the probability of an incident occurring, combined with the potential severity of the harm.

Real property contractor: a person, entity, or entities named in contracts to supply services to Canada as defined in procurement mechanisms such as RP-1 property management and project delivery services; RP-2 National Capital Area property management, project delivery services and optional services; and subsequent real property procurement mechanisms RP-n.

Service provider: a person or entity who performs work for and/or supplies services to the owner for monetary compensation, either by undertaking the work alone, by employing one or more workers, or by contracting the services of one or more workers.

Supervisor: a person who has the responsibility for day to day supervision of other employees, e.g. assigns work, sets priorities, assesses performance, and approves or recommends approval of leave.

Workplace: any place where an employee is engaged in work for the department.

Workplace Health and Safety Committee: as defined in the *Canada Labour Code*, Part II, Occupational Health and Safety, Sections 134.1, 135, and 136.

Vermiculite: silicate mineral with a layered (mica-like) morphology which may range in colour from silvery-blond to dark grey-brown. For the purposes of this document, vermiculite with any concentration of asbestos measured in a composite sample taken in accordance with provincial/territorial sampling and analysis standards is considered an asbestos-containing material.

8. References

Federal acts and regulations:

[Canada Labour Code, Part II](#)
[Canada Occupational Health and Safety Regulations](#)
[Canadian Environmental Protection Act](#)
[Hazardous Materials Information Review Act](#)
[Hazardous Products Act](#)

National Joint Council publications:

[Occupational Health and Safety Directive](#)
[Occupational Health Evaluation Standard](#)

PSPC publications:

[Directive on occupational health and safety - Hazard prevention program \(007-1\)](#)
[Policy on occupational health and safety \(007\)](#)
[Procedure on Respiratory Protection](#)
[Records management and information holdings](#)
[Standard on Hazardous Occurrence Investigation and Reporting](#)
[Standard on Personal Protective Equipment and Clothing for Employees](#)
PWGSC's Invitation to Offer document

Other publications:

Provincial and territorial occupational health and safety legislation
Provincial and territorial environmental protection legislation
American Conference of Governmental Industrial Hygienists (ACGIH), TLVs and BEIs Book (as amended from time to time)
[Canadian National Master Construction Specification \(NMS\)](#) - Asbestos Abatement Precautions

Attachments

Annex A – Evaluation of Asbestos-Containing Materials and Recommendations for Control
Annex B – Asbestos-containing Material Reassessment

9. Enquiries



Please direct all enquiries regarding this standard to:
Senior Director, Environment, Health & Safety
Technical Services
Real Property Branch, PSPC

Evaluation of Asbestos-Containing Materials and Recommendations for Control

1. Assessment of condition

1.1. Spray-applied fireproofing, insulation and texture finishes

In evaluating the condition of asbestos-containing material spray applied as fireproofing, thermal insulation, or texture, decorative or acoustic finishes, the following criteria apply:

GOOD Surface of material shows no significant signs of damage, deterioration or delamination. Up to one percent of the surface area having visible damage to surface is allowed within range of GOOD. Evaluation of sprayed fireproofing requires the assessor to be familiar with the irregular surface texture typical of sprayed asbestos products. GOOD condition includes un-encapsulated or unpainted fireproofing, insulation or texture finishes where no delamination or damage is observed, and encapsulated fireproofing, insulation or texture finishes where the encapsulation has been applied after the damage or fallout occurred.

POOR Sprayed materials show signs of damage, delamination or deterioration. More than one percent damage to surface of asbestos-containing material spray.

In observation areas, where damage exists in isolated locations, both GOOD and POOR condition may be reported. The extent or percentage of each condition will be recorded on the survey or reassessment form.

NOTE: FAIR condition is not used or considered as a valid criterion in the evaluation of sprayed fireproofing, sprayed insulation, or texture coat finishes.

The evaluation of asbestos-containing material spray applied as fireproofing, non-mechanical thermal insulation, or texture, decorative, or acoustic finishes which are present above ceilings may be limited by the number of observations made, and by building components such as ducts or full-height walls that obstruct the above-ceiling observations. Persons entering the ceiling area are advised to be watchful for asbestos-containing material debris prior to accessing or working above ceilings in areas of buildings with asbestos-containing material, regardless of the reported condition.

1.2. Detection limit of bulk analysis

Asbestos-containing material is defined as any material found to contain asbestos at or above the limit defined by provincial/territorial standards for an asbestos-containing material, as determined by the allowable analytical method for the analysis of bulk samples (refer to *Asbestos Management Standard*, Section 6.1.2.2). Except in the case of vermiculite, the provincially/territorially-regulated limits or generally-accepted guidelines to consider a

material as an asbestos-containing material, subject to asbestos in buildings regulation, are provided as follows:

MINIMUM CONCENTRATION TO CONSIDER AS AN ASBESTOS-CONTAINING MATERIAL (BY PROVINCE)

QUEBEC (includes part of National Capital Area)	0.1%
MANITOBA, SASKATCHEWAN (for friable material)	0.1%
ONTARIO (includes part of National Capital Area) BRITISH COLUMBIA	0.5%
NOVA SCOTIA	0.5%
All other provinces and territories, (non-friable material in Manitoba, Saskatchewan)	1.0%

Note that these concentrations may change with regulatory amendments, therefore applicable legislation should be consulted to confirm that they are still valid.

Vermiculite is considered an asbestos-containing material in the presence of any concentration of asbestos measured in a composite sample taken in accordance with provincial/territorial sampling standards.

1.3. Mechanical insulation

In evaluating the condition of mechanical insulation (on boilers, breeching, ductwork, piping, tanks, equipment, etc.) the following criteria are used:

GOOD Insulation is completely covered in jacketing and exhibits no evidence of damage or deterioration, i.e. no insulation is exposed. Includes conditions where the jacketing has minor surface damage (i.e. scuffs or stains), but the jacketing is not penetrated.

FAIR Minor penetration damage to jacketed insulation (cuts, tears, nicks, deterioration or delamination), or undamaged insulation that has never been jacketed. Insulation is exposed but not showing surface disintegration. The extent of missing insulation should range from minor to none.

POOR Original insulation jacket is missing, damaged, deteriorated or delaminated. Insulation is exposed and significant areas have been dislodged. Damage cannot be readily repaired.

The evaluation of mechanical insulation may be limited by the number of observations made and building components such as ducts or full-height walls that obstruct observations. In these circumstances, it is not possible to observe each foot of mechanical insulation from all angles.

1.4. Non-friable and potentially-friable materials

Non-friable materials generally have little potential to release airborne fibres, even when damaged by mechanical breakage, but can become friable if disturbed by drilling or abrading.

However, some non-friable materials, e.g. exterior asbestos cement products, may have deteriorated so that the binder no longer effectively contains the asbestos fibres. In such cases of significantly-deteriorated non-friable material, the material will be treated as a friable product.

1.4.1. Asbestos-containing material debris

1.4.1.1. Debris from friable asbestos-containing material

The presence of fallen friable asbestos-containing material is noted separately from the presumed friable asbestos-containing material source (sprayed fireproofing, thermal insulation, texture, decorative or acoustic finishes or mechanical insulation) and is referred to as **debris**.

The presence of fallen asbestos-containing material from damaged non-friable asbestos-containing material is reported separately from the non-friable asbestos-containing material source. Fallen non-friable asbestos-containing material that has become friable is reported as debris. Workers are advised to be watchful for the presence of debris prior to accessing, or working in proximity to, mechanical insulation or above ceiling areas of buildings with asbestos-containing material, regardless of the reported presence or absence of debris.

1.4.2. Evaluation of accessibility

The accessibility of building materials known or suspected of being asbestos-containing material is rated according to the following criteria:

- ACCESS (A) Areas of the building within reach (from floor level) of all building users. Includes areas such as gymnasiums, workshops, and storage areas where activities of the building users (e.g. basketball on gym ceiling) may result in disturbance of asbestos-containing material not normally within reach from floor level.

- ACCESS (B) Frequently entered maintenance areas within reach of maintenance staff, without the need for a ladder. Includes: frequently entered pipe chases, tunnels and service areas or areas within reach from a fixed ladder or catwalk, e.g. tops of equipment, mezzanines.

- ACCESS (C)
EXPOSED Areas of the building above 8'0" where use of a ladder is required to reach the asbestos-containing material. Only refers to asbestos-containing material materials that are exposed to view, from the floor or ladder, without removing or opening other building components such as ceiling tiles, or service access doors or hatches. Does not include infrequently-accessed service areas of the building.

ACCESS (C)

CONCEALED Areas of the building which require the removal of a building component, including lay-in ceilings and access panels into solid ceiling systems such as a ventilation plenum. Includes rarely-entered crawl spaces, attic spaces, etc. Observations are limited to the extent visible from the access points.

ACCESS (D) Areas of the building behind inaccessible solid ceiling systems, walls, or mechanical equipment, etc., where demolition of the ceiling, wall or equipment, etc., is required to reach the asbestos-containing material. Evaluation of condition and extent of asbestos-containing material is limited or impossible, depending on the assessor's ability to visually examine the materials in areas rated Access (D).

1.4.3. Action matrix and action descriptions

The action matrix below (Table 1) prioritizes the corrective actions in terms of potential health risk based on condition, accessibility, and potential for future disturbance.

The following factors shall be considered in making site-specific recommendations for corrective actions in conformance with the existing applicable regulation or codes of practice in most provinces, and for the practical implementation of asbestos management:

1. Asbestos-containing material in POOR condition is not routinely repairable. If an abatement action is necessary, removal is the recommended action (enclosure is a viable option in unusual circumstances, e.g. where removal is difficult or costly and the asbestos-containing material can be thoroughly enclosed).
2. Mechanical insulation in FAIR condition will be repaired or removed based on the following general recommendations, applied on a case-by-case basis:
 - Asbestos-containing mechanical insulation found in FAIR condition in ACCESS (B) or ACCESS (C) EXPOSED areas is to be repaired.
 - Asbestos-containing mechanical insulation found in FAIR condition in ACCESS (B) and ACCESS (C) EXPOSED areas, where future damage to the asbestos-containing material is likely to occur, is to be removed.
3. Asbestos-containing material in GOOD condition present in ACCESS (A) can be managed by surveillance, as long as it is not disturbed by future renovation, maintenance or demolition. Proactive removal of the asbestos-containing material in ACCESS (A) will be considered where damage is possible by ongoing occupant activity (accidental or intentional).
4. Non-friable or manufactured products are considered in the action matrix as follows:
 - Non-friable and manufactured products reported in POOR condition, or friable DEBRIS resulting from the deterioration of non-friable asbestos-containing material, are treated as friable materials and the appropriate action, depending on

accessibility, is determined from the action matrix for friable asbestos-containing material.

- For non-friable or manufactured products reported in GOOD condition, Action 7 (surveillance) is recommended regardless of accessibility.

5. All asbestos-containing material from a particular area is to be removed where small quantities of asbestos are present and removal will negate the need for the use of an Asbestos Management Program in that area.

The action matrix provided below establishes the recommended asbestos control action. The ACTIONS themselves are described in full following the table.

Table 1: Action matrix for determining actions required based on the location and condition of asbestos-containing materials.

ASBESTOS-CONTAINING MATERIAL				
ACCESS	CONDITION			DEBRIS
	GOOD	FAIR	POOR	
(A)	ACTION 5/7 ¹	ACTION 5/6 ²	ACTION 3	ACTION 1
(B)	ACTION 7	ACTION 6/5 ³	ACTION 3	ACTION 1
(C) exposed	ACTION 7	ACTION 6	ACTION 4	ACTION 2
(C) concealed	ACTION 7	ACTION 7	ACTION 4	ACTION 2
(D)	ACTION 7	ACTION 7	ACTION 7	ACTION 7

¹ If material in **ACCESS (A)/GOOD** condition is not removed, **ACTION 7** is required.

² If material in **ACCESS (A)/FAIR** condition is not removed, **ACTION 6** is required.

³ Remove asbestos-containing material in **ACCESS (B)/FAIR** condition if asbestos-containing material is likely to be disturbed.

ACTION 1 Immediate clean-up of debris that is likely to be disturbed.

Access that is likely to cause a disturbance of the ASBESTOS-CONTAINING MATERIAL DEBRIS is to be restricted and clean up ASBESTOS-CONTAINING MATERIAL DEBRIS is to be done immediately. Use correct asbestos procedures. This action is required for compliance with regulatory requirements and good practice. The assessor should immediately notify the Asset or Property and Facility Manager, or Regional/Area Asbestos Management Coordinator of this condition.

ACTION 2 Entry into areas with asbestos-containing material debris requires intermediate risk precautions.

At locations where ASBESTOS-CONTAINING MATERIAL DEBRIS can be isolated in lieu of removal or cleaned up, appropriate means to limit entry to the area is to be used. Access to the area is restricted to persons using intermediate risk asbestos-work precautions. The precautions will be required until the ASBESTOS-CONTAINING MATERIAL DEBRIS has been cleaned up, and the source of the DEBRIS has been stabilized or removed following intermediate risk (if minor) or high risk precautions.

ACTION 3 Asbestos-containing material removal required for compliance.

Asbestos-containing material must be removed for compliance with regulatory requirements and good practice. Use asbestos procedures appropriate to the scope of the removal work.

ACTION 4 Access into areas where asbestos-containing material is present and likely to be disturbed by access requires intermediate risk precautions.

Intermediate risk asbestos precautions are to be used when entry or access into an area is likely to disturb the asbestos-containing material. ACTION 4 must be used until the asbestos-containing material is removed (Use ACTION 1 or 2 if DEBRIS is present). Intermediate risk or high risk precautions should be used for removal (depending on extent of removal).

ACTION 5 Proactive asbestos-containing material removal.

Removal of asbestos-containing material in lieu of repair may be considered, even if it is in GOOD condition at locations, where asbestos-containing material is easily accessible, limited in quantity, and removal would be cost-effective.



ACTION 6 Asbestos-containing material repair.

Asbestos-containing material may be repaired if found in FAIR condition and not likely to be damaged again or disturbed by normal use of the area or room. Upon completion of the repair work, asbestos-containing material is to be treated as being in GOOD condition and ACTION 7 is to be implemented. If asbestos-containing material is likely to be damaged or disturbed during normal use of the area or room, ACTION 5 is to be implemented.

ACTION 7 Routine Surveillance.

Routine surveillance of the asbestos-containing material is to be instituted. Trained workers or service providers must use appropriate asbestos precautions (low, intermediate or high) during disturbance of the remaining asbestos-containing material.

Asbestos-containing Material Reassessment

The following outlines the **minimum** requirements to include in all Asbestos Reassessment Reports.

Table of contents

The table of contents is to include a list of tables and a list of appendices. At minimum, appendices include:

- photographs of damaged asbestos (clearly labeled linking to findings tables); and
- the requirements set out in the *Asbestos Management Standard*.

Executive summary

The following must be noted when preparing the executive summary:

1. The executive summary is to be written in layman's terms. Every effort must be made to use plain language, and where technical information is used, context must be given for the average reader.
2. Reference is to be made to the previous year's assessment/reassessment, and the status of any areas previously identified as Action level 1.
3. When identifying asbestos materials, it is to be noted if the location is accessible to building occupants, maintenance staff, or service providers.
4. The term "not compliant" is only to be used when referring to a regulation - the exact title of the regulation is to be cited, as well as the specific section where there is a compliance issue. NOTE: guidelines, and departmental/Employer policies and processes are not regulatory items and "compliance" terminology cannot be used for these type of documents.

Introduction

The introduction is to include the following elements:

- The regulatory and "other" requirements are to be outlined:
 - applicable requirements under the *Canada Labour Code*
 - applicable provincial acts and regulations
 - RPB policy/directive/standard requirements
- Purpose
- Scope
- Limitations of the assessment conducted

Methodology

Information must be included as to how RPB documentation is used when assessing condition of materials, as well as accessibility.

Survey findings

This section must include a general description of the building. Findings are to be presented in a table format as follows:

- Table 1 – Summary of Findings (Action level 1 – This must include any newly-discovered materials covered in Table 3 which are considered Action level 1). A note must be included stating that items in this table should be actioned as soon as possible.
- Table 2 – Summary of Findings (for all materials other than Action level 1). A note must be included stating that items in this table are less urgent and can be addressed through long term action plans.
- Table 3 – Summary of Findings (newly-discovered materials – if applicable)

Each table in which the findings are presented must use the following headings (example provided):

Floor	Location	Material Description	Quantity	Condition	Accessibility	Action Level
8th	Rm 812	Pipe Fitting (paring cement)	5 fittings	Good	C (concealed)	7

Conclusions and recommendations

State any conclusions reached and recommendations for further action.

Abatement strategies

If applicable, provide abatement strategies, including the following:

- the complexity of the abatement (low, intermediate, or high risk); and
- a general description of the project, as well as the estimated scope/size of the abatement.