



November 13, 2017

Dave Ness  
Public Services and Procurement Canada

**Subject: Project-Specific Designated Substance Survey Report  
Talbot Dam at Lock 38, 1427 Canal Road, Brechin, Ontario**

Dear Sir:

WSP Canada Inc. is pleased to provide this report detailing the results of the project-specific Designated Substances and hazardous materials survey, including asbestos and lead sampling, at the Talbot Dam at Lock 38, located at 1427 Canal Road, in Brechin, Ontario. WSP's walkthrough and survey was conducted on October 18, 2017.

Please do not hesitate to contact the undersigned should you have any questions, or require any further assistance.

Yours truly,

**WSP Canada Inc.**

Stephen Heikkila, P.Eng.  
Project Engineer, Environment

Conrad Goericke, C.Tech.  
Project Coordinator, Environment

cg/

Encl. Appendix A – Site Photographs  
Appendix B – Laboratory Certificates of Analysis  
Appendix C – Asbestos-Containing Evaluation Criteria  
Appendix D – Background and Past Uses of Designated Substances

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## BACKGROUND

WSP Canada Inc. (WSP) was retained by Public Services and Procurement Canada (PSPC) to conduct a project-specific Designated Substances and Hazardous Materials Survey (the “survey”) of materials, components and areas at the Talbot Dam at Lock 38 (the “subject area”), located at 1427 Canal Road, in Brechin, Ontario.

The survey was conducted by WSP on October 18<sup>th</sup>, 2017. It was requested in advance of proposed demolition and focused specifically on materials in the subject area which will be directly impacted, in order to satisfy the requirements of *Ontario Regulation 278/05 (O. Reg. 278/05)*, the *Canada Labour Code* and the *PSPC Asbestos Management Standard*.

## SCOPE OF WORK

The survey was thorough and intrusive, but not destructive. Intrusive surveys consist of investigating spaces, materials and components which are easily accessible, or those which may be accessed by moveable (non-fixed) barriers such as above suspended ceiling tiles, access doors, hatches, panels etc.

Bulk sampling was performed in a manner that minimized repetition of testing of like materials or materials which have previously been surveyed.

WSP’s scope of work for this project consisted of:

- A thorough visual inspection of the subject area 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* and *PSPC’s Asbestos Management Standard*;
- Collection of a representative number of bulk paint samples by scraping the paint down to the base structure in order to determine the lead concentration in all paint layers present;
- Visual identification of suspected or obvious signs of mould; and
- Visual identification of other Designated Substances and hazardous materials which may be impacted by the proposed work including; equipment containing ODS, mercury, fuel, oil and/or waste oil storage, chemical storage, UFFI and/or radioactive materials. Where possible name plate/label information and estimated quantities were recorded.

## OBSERVATIONS AND RESULTS

### DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS

It should be noted that asbestos-containing materials (ACM), Designated Substances or hazardous materials may be concealed by existing finishes, components or fixtures. If demolition or construction activities uncover materials suspected to contain asbestos, lead, other Designated Substances or hazardous materials, all work must stop prior to the disturbance of these materials, and the suspect materials should either be sampled by a qualified person, or presumed to contain the suspected substance. Whether the suspect material(s) are confirmed, or presumed, to contain these substances, they must be handled and disposed of in accordance with the appropriate and applicable guidelines and regulations including, but not limited to: *O. Reg. 278/05*, *O. Reg. 490/09*, *R.R.O. 1990, Regulation 347* (as amended), and *PSPC’s Asbestos Management Standard*.

## ASBESTOS-CONTAINING MATERIALS

Sampling of the suspect structural materials throughout the subject area was conducted in order to determine asbestos content and satisfy the requirements of *O. Reg. 278/05*. In Ontario, asbestos-containing material (ACM) is defined as any material that has an asbestos concentration of 0.5% or greater, by dry weight.

A total of seven (7) samples, from one (1) homogeneous materials, were collected from the subject area. All samples were submitted to an independent laboratory (EMSL Analytical of Mississauga, ON) for analysis of asbestos content. Samples were analysed using Polarized Light Microscopy (PLM) following the EPA600/R-93/116 method in accordance with *O. Reg.278/05*.

### **No asbestos-containing materials were identified in the immediate proposed area of work.**

Recommended actions for management, repair or removal of these materials, are based on the requirements and procedures specified by *O. Reg. 278/05* and have been suggested based on the type of disturbance which is anticipated or likely. Alternate handling, repair and removal procedures must comply with the requirements of *O. Reg. 278/05* (as amended), and *O.Reg. 490/09*. Refer to Appendix C for condition, accessibility and action definitions.

If any other suspected asbestos-containing materials are encountered during the proposed construction, handling, repair and removal procedures must comply with the requirements of *O. Reg. 278/05*, *O.Reg. 490/09*, and PSPC’s *Asbestos Management Standard*.

## SUMMARY OF BULK SAMPLES IDENTIFIED AS “NON-ASBESTOS”

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 1 Summary of Bulk Samples Identified as “Non-Asbestos”**

MATERIAL DESCRIPTION / LOCATION	SAMPLE ID <sup>1</sup>
Concrete, dam structure	ACM-01-A,B,C,D,E,F,G

1. For sample ID and concentration levels refer to **Appendix B – Laboratory Certificates of Analysis**.

## LEAD-CONTAINING PAINT

Paint and/or surface coating applications were sampled to determine lead content. Paint and surface coating applications with lead concentrations greater than or equal to 90 parts per million (ppm) by weight are being considered “lead-containing” based on the Federal Surface Coating Materials Regulation (*SOR/2016-193*).

A total of two (2) paint samples were collected and submitted to an independent laboratory (EMSL Analytical of Mississauga, ON) for analysis of lead content. Lead analysis was performed following ASTM Method D3335-85A “Standard Method to Test for Low Concentrations of Lead in Paint by Atomic Absorption Spectrophotometry”.

**Table 2 Lead Sampling Results**

SAMPLE ID	DESCRIPTION / LOCATION	CONDITION	LEAD
			CONCENTRATION <sup>1</sup>
Pb-01	Yellow Paint on Railings <i>Photograph #3</i>	Poor	12,000 ppm
Pb-02	Black Paint on Railings and Equipment <i>Photograph #4</i>	Poor	15,000 ppm

1. See Appendix B – Laboratory Certificates of Analysis

Reporting detection limit is 90 ppm based on the minimum sample weight per EMSL’s SOP: Determination of Environmental Lead by FLAA.

Both of the sampled paint applications were found to be lead-containing.

In general, the following procedures are recommended when disturbing or removing lead-containing materials, coatings and paint applications:

- Follow **Type 1** – if the coating is to be removed with a chemical gel or paste;
- Follow **Type 2a** – if the coating is to be removed by scraping or sanding using non-powered hand tools, or manual demolition of lead-painted structural components by striking with sledgehammer or similar tool;
- Follow **Type 3a** – if the coating is to be removed using power tools; or
- Follow **Type 3b** – if the coating is to be removed by abrasive blasting.

Disturbance or removal of lead-containing paint should follow the safe work practices prescribed by the *Ministry of Labour’s Guideline for Lead on Construction Projects*, and the *Environmental Abatement Council of Ontario’s (EACO) “Lead Guideline for Construction, Renovation, Maintenance or Repair”*.

If lead-containing paint applications and surface coatings are not removed prior to the handling, disturbance or removal of the substrate materials, ensure that the disposal of lead containing waste complies with the requirements of *General – Waste Management Regulation, R.R.O. 1990, Regulation 347*.

## 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.

**Table 3 Summary of Other Designated Substances and Hazardous Materials**

MATERIAL	DESCRIPTION	ACTION
Silica	Structural components containing silica, such as concrete, were observed throughout the subject areas.	Work that may disturb silica-containing materials should follow all applicable provincial and federal regulations and guidelines pertaining to Silica including the requirements of <i>O. Reg. 490/09</i> , and the <i>Ministry of Labour's Guideline for Silica on Construction Projects</i> .
Mercury	Mercury-containing equipment was not observed within the subject area at the time of the survey.	No action required.
PCBs	PCB-containing materials were not observed within the subject area at the time of the survey.	No action required.
ODS	Ozone-Depleting Substances (ODS) were not observed in the subject area at the time of the survey.	No action required.
Mould	Visible mould was not observed in the subject area at the time of the survey.	No action required.
Benzene	Benzene was not observed in the subject area at the time of the survey.	No action required.
Acrylonitrile	Acrylonitrile was not observed in the subject area of work during the time of the survey.	No action required.
Arsenic	Arsenic was not observed in the subject area at the time of the survey.	No action required.
Coke Oven Emissions	Coke oven emissions were not observed in the subject area at the time of the survey.	No action required.
Ethylene Oxide	Ethylene oxide was not observed in the subject area at the time of the survey.	No action required.
Isocyanates	Isocyanates were not observed in the subject area at the time of the survey.	No action required.
Vinyl Chloride	Vinyl chloride was not observed in the subject area at the time of the survey.	No action required.

## LIMITATIONS

This report describes the Designated Substances and Hazardous Materials observed by the surveyor(s) in the subject areas. The surveyor(s) assessed only those structures, finishes and permanent equipment identified in this report. The assessment does not consider, or define contaminants that may or may not be present in the soil or air around the site.

The field observations and laboratory analyses presented herein are considered sufficient in detail and scope to form a general inventory of Designated Substances in the subject area(s). The findings and conclusions contained herein have been prepared in accordance with generally accepted industry standards and methods. It is possible that Designated Substances or Hazardous Materials may exist which could not be reasonably identified within the scope of the assessment or which were not apparent during the site visit. WSP Canada Inc. cannot warrant or guarantee that the information presented in this report is absolutely complete or accurate beyond those observations and findings reported herein.

# APPENDIX

# A

## SITE PHOTOGRAPHS





**Photo #1:** View of the west side of the Dam at Lock 38 (facing east).



**Photo #2:** View of the east side of the Dam at Lock 38 (facing south).



**Photo #3:** View of lead-containing yellow paint on railings throughout the subject area.

Sample ID: Pb-01



**Photo #4:** View of lead-containing black paint on equipment within the subject area.

Sample ID: Pb-02

# APPENDIX

**B**

LABORATORY  
CERTIFICATES OF  
ANALYSIS



# EMSL Canada Inc.

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Phone/Fax: 289-997-4602 / (289) 997-4607  
<http://www.EMSL.com> / [torontolab@emsl.com](mailto:torontolab@emsl.com)

EMSL Canada Order 551711502  
Customer ID: 55MMM25  
Customer PO: 161-14299-00  
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:** 10/18/2017  
**Received:** 10/19/2017  
**Analyzed:** 10/26/2017

**Proj:** 161-14299-00 Dam @ Lock 38

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

**Client Sample ID:** ACM-01-A **Lab Sample ID:** 551711502-0001

**Sample Description:** Concrete

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	10/26/2017	Gray	0%	100%	None Detected	

**Client Sample ID:** ACM-01-B **Lab Sample ID:** 551711502-0002

**Sample Description:** Concrete

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	10/26/2017	Gray	0%	100%	None Detected	

**Client Sample ID:** ACM-01-C **Lab Sample ID:** 551711502-0003

**Sample Description:** Concrete

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	10/26/2017	Gray	0%	100%	None Detected	

**Client Sample ID:** ACM-01-D **Lab Sample ID:** 551711502-0004

**Sample Description:** Concrete

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	10/26/2017	Gray	0%	100%	None Detected	

**Client Sample ID:** ACM-01-E **Lab Sample ID:** 551711502-0005

**Sample Description:** Concrete

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	10/26/2017	Gray	0%	100%	None Detected	

**Client Sample ID:** ACM-01-F **Lab Sample ID:** 551711502-0006

**Sample Description:** Concrete

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	10/26/2017	Gray	0%	100%	None Detected	

**Client Sample ID:** ACM-01-G **Lab Sample ID:** 551711502-0007

**Sample Description:** Concrete

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	10/26/2017	Gray	0%	100%	None Detected	



## EMSL Canada Inc.

2756 Slough Street Mississauga, ON L4T 1G3  
Phone/Fax: 289-997-4602 / (289) 997-4607  
<http://www.EMSL.com> / [torontolab@emsl.com](mailto:torontolab@emsl.com)

EMSL Canada Order 551711502  
Customer ID: 55MMMG25  
Customer PO: 161-14299-00  
Project ID:

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

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#### Analyst(s):

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Anne Balayboa PLM (3)  
Natalie D'Amico PLM (4)

#### Reviewed and approved by:

Matthew Davis  
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: 10/26/2017 12:37:48



**EMSL Canada Inc.**

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EMSL Canada Or	551711505
CustomerID:	55MMMMG25
CustomerPO:	161-4299-00
ProjectID:	

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Phone: (905) 882-4211  
 Fax: (905) 882-1857  
 Received: 10/19/17 12:03 PM  
 Collected: 10/18/2017

Project: 161-4299-00 DAM @ Lock 38

**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>Lead Concentration</i>
Pb-01	551711505-0001	10/18/2017	10/20/2017	12000 ppm
Site: Yellow Paint on Railings				
Pb-02	551711505-0002	10/18/2017	10/20/2017	15000 ppm
Site: Black Paint on Railings/Equipment				

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 10/26/2017 08:49:01

# APPENDIX

# C

ASBESTOS-CONTAINING  
MATERIALS EVALUATION  
CRITERIA

## ASBESTOS-CONTAINING MATERIAL EVALUATION CRITERIA

A description of the criteria used in evaluating the condition, accessibility and exposure risk of asbestos-containing materials (ACM) is provided below.

### ASSESSMENT OF CONDITION

#### SPRAY-APPLIED FIREPROOFING, INSULATION AND TEXTURED FINISHES

In evaluating the condition of ACM 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 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 or texture finishes, where no delamination or damage is observed, and encapsulated fireproofing 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 ACM 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 Assessor reassessment form.

**Fair** condition is not utilized or considered as a valid criterion in the evaluation of sprayed fireproofing, sprayed insulation, or texture coat finishes.

The evaluation of ACM 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 ACM DEBRIS prior to accessing or working above ceilings in areas of building with ACM, regardless of the reported condition.

#### OTHER ACM

In evaluating the condition of mechanical insulation (on boilers, breaching, 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. 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 ranges should be 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.

## NON-FRIABLE AND POTENTIALLY FRIABLE MATERIALS

Non-friable materials generally have little potential to release airborne fibres, even when damaged by mechanical breakage. However, some non-friable materials, i.e., 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.

## EVALUATION OF ACCESSIBILITY

The accessibility of building materials known or suspected of being ACM is rated according to the following criteria:

### Access (A)

Areas of the building within reach of all building users. Includes areas such as gymnasiums, workshops, and storage areas where activities of the building users may result in disturbance of ACM 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, i.e., tops of equipment, mezzanines.

### Access (C) Exposed

Areas of the building above 8'0" where use of a ladder is required to reach the ACM. Only refers to ACM 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. 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 ACM. Evaluation of the condition and extent of ACM is limited or impossible, depending on the Assessor's ability to visually examine the materials in Access D.

## DEFINITION OF ACTION LEVELS

Based on the results of the inspection and bulk sample analysis of samples collected and submitted for testing, recommendations were provided for compliance with regulation. These include assigned "Action Levels" to assist in the prioritization of corrective measures. The Action Matrix provided below establishes the recommended asbestos control action. The measures that are to be taken for each "Action Level" are described in full following the matrix.

ACM ACTION MATRIX				
Access	Condition			Debris
	Good	Fair	Poor	
(A)	ACTION 5/7 <sup>1</sup>	ACTION 5/6 <sup>2</sup>	ACTION 3	ACTION 1
(B)	ACTION 7	ACTION 6/5 <sup>3</sup>	ACTION 3	ACTION 1
(C) exposed	ACTION 7	ACTION 6	ACTION 4	ACTION 2
(C) concealed	ACTION 7	ACTION 6	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 ACM in ACCESS (B)/FAIR condition if ACM is likely to be disturbed.			
4.	Suspect ACM are to comply with ACTION 8 requirements.			

ACTION LEVEL	REQUIRED ACTION
“ACTION 1”	<p><b><i>Immediate Clean-Up of Debris that is Likely to Be Disturbed</i></b></p> <p>Restrict access that is likely to cause a disturbance of the ACM DEBRIS and clean up ACM DEBRIS immediately. Utilize correct asbestos procedures. This action is required for compliance with regulatory requirements. The surveyor will immediately notify the owner of this condition.</p>
“ACTION 2”	<p><b><i>Type 2 Precautions for Entry into Areas with ACM DEBRIS</i></b></p> <p>At locations where ACM DEBRIS can be isolated in lieu of removal or cleaned up, use appropriate means to limit entry to the area. Restrict access to the area to persons utilizing Type 2 asbestos precautions. The precautions will be required until the ACM DEBRIS has been cleaned up, and the source of the DEBRIS has been stabilized or removed.</p>
“ACTION 3”	<p><b><i>ACM Removal Required for Compliance</i></b></p> <p>Remove ACM for compliance with regulatory requirements. Utilize asbestos procedures appropriate to the scope of the removal work.</p>
“ACTION 4”	<p><b><i>Type 2 Precautions for Access into Areas Where ACM is Present &amp; Likely to be Disturbed by Access</i></b></p> <p>Use Type 2 asbestos precautions when entry or access into an area is likely to disturb the ACM. ACTION 4 must be used until the ACM is removed (Use ACTION 1 or 2 if DEBRIS is present).</p>
“ACTION 5”	<p><b><i>Proactive ACM Removal</i></b></p> <p>Remove ACM in lieu of repair, or at locations where the presence of asbestos in GOOD condition is not desirable.</p>
“ACTION 6”	<p><b><i>ACM Repair</i></b></p> <p>Repair ACM 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, treat ACM as material in GOOD condition and implement ACTION 7. If ACM is likely to be damaged or disturbed, during normal use of the area or room, implement ACTION 5.</p>
“ACTION 7”	<p><b><i>Asbestos Management Program with Routine Surveillance</i></b></p> <p>Implement an Asbestos Management Program, including routine surveillance of ACM. Trained workers or contractors must use appropriate asbestos precautions (Type 1, Type 2 or Type 3) during disturbance of the remaining ACM.</p>
“ACTION 8”	<p><b><i>Suspect Materials</i></b></p> <p>Implement the Asbestos Management Program for building materials that historically contained asbestos but cannot, or have not, been sufficiently tested for asbestos content. These materials are identified as SUSPECT MATERIALS.</p>

# APPENDIX

**D**

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.