

Industrial Hygiene and Environmental Consulting

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**DESIGNATED SUBSTANCE AND HAZARDOUS
MATERIAL EVALUATION**

Fort George Powder Magazine Building

Submitted To: Parks Canada

Issued: September 20, 2019

OESN Project #: 00090.008

PROJECT SUMMARY SHEET

Report Title: Designated Substance and Hazardous Material Survey 2019

Project Location: Fort George Powder Magazine Building
51 Queen's Parade
Niagara-on-the-Lake, ON L0S 1J0

Project #: 00090.008

Report Submission Date: September 20, 2019

Submitted to: **Parks Canada**
Cameron Fowler
A/Asset Support Technician - National Historic Sites
Parks Canada Agency
440 King Street
Niagara-on-the-Lake, ON L0S 1J0

Authored by: Ontario Environmental & Safety Network Ltd. (OESN)

OESN Field Consultants: **Madison Easterbrook**

OESN Project Manager: **Shaun Husband**

Laboratories: **Eurofins CEI**
Cary, North Carolina
National Voluntary Laboratory Accreditation Program (NVLAP) – Lab Code A192490

Paracel Laboratories Ltd.
Hamilton, Ontario
Canadian Association for Laboratory Accreditation Inc. (CALA) – Membership Number 1262

Analysis Methods: EPA 600 Method (PLM) (Asbestos)
EPA 6020 Digestion-ICP-MS (Metals)
EPA 7471B - CVAA, digestion (Mercury)

Designated Substance(s) Considered: Asbestos, Arsenic, Lead, Mercury, Silica

Other Hazardous Agents Considered: Mould, Polychlorinated Biphenyls, Biological Contaminants
Ozone Depleting Substances

Executive Summary

On August 23, 2019, an evaluation of the Fort George Powder Magazine Building located at 51 Queen's Parade, Niagara-on-the-Lake, ON, was conducted to identify designated substances and hazardous materials prior to renovations. The exterior of the building was also inspected as part of the evaluation; however, roofing materials were not included with the samples collected due to inaccessibility.

Evaluation included inspection, collection and testing of materials suspected of containing designated substances.

The evaluation determined **asbestos** minerals are **not present** in the materials sampled.

Lead and **mercury** was detected in the paint coating sampled at levels that do not warrant consideration for workers protection if materials are disturbed.

Silica is assumed to be present within any concrete material.

Refer to the appended photo log (Appendix A) for additional information.

Recommendations provided are in accordance with provincial requirements.

About the Author

This assessment was prepared by Ontario Environmental & Safety Network Ltd. (OESN).

OESN has been in business providing industrial hygiene, hazardous material assessment and occupational health and safety services since 1996.

Site work was conducted by Madison Easterbrook, who has experience assessing buildings for designated substances and hazardous materials.

The project was managed by Shaun Husband who has over twelve years of conducting designated substances assessments and consulting experience.

All work conducted was done to the best of our abilities and based on our knowledge, experience and the requirements of international and local legislation and industry best practice.

Please contact our office at 1-888-271-2111 with respect to questions or discussion regarding the content of this report.

Regards,



Madison Easterbrook
Consultant
measterbrook@oesn.net

Reviewed by,



Shaun Husband
Project Manager
shusband@oesn.net

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1.0 INTRODUCTION

1.1 OVERVIEW

On August 23, 2019 an evaluation was conducted of the interior and exterior of the Powder Magazine building at Fort George located at 51 Queen's Parade, Niagara-on-the-Lake. The survey did not include sampling of the roofing materials due to inaccessibility. The purpose of the evaluation was to identify select designated substances and hazardous materials through visual observation, bulk sampling, and analytical testing in preparation for upcoming renovations.

1.2 BACKGROUND

The Occupational Health and Safety Act (The Act) for the Province of Ontario defines designated substances as biological, chemical or physical agents or combination thereof to which the exposure of a worker is prohibited, regulated, restricted, limited or controlled.

Section 30(1) of The Act prescribes duties for owners to determine if these designated substances are present at a site prior to commencement of a construction project where disturbance is likely.

Industry interprets this requirement to include for the provision of a scope of work that assesses all structural and finishing materials (including equipment) that were used in the construction of a building.

1.3 SCOPE OF WORK

OESN scope of services included the following:

1. Identify designated substances or hazardous materials present within the structure; and
2. Provide a report that allows contractor to identify the hazards present and their location(s).

To meet these objectives, the following scope of work was developed and carried out:

1. Evaluation of interior and exterior structural and finishing materials of the building.
2. Collection of bulk samples of materials suspected to contain designated substances and analysis at an accredited laboratory.
3. Assess condition of building materials suspected to contain asbestos minerals.
4. Chain of custody control for all samples submitted.
5. Documentation of materials with known hazardous content such as silica-containing concrete.
6. Documentation of observations on site forms and collection of photographs of materials sampled.

Excluded from the scope of work was evaluation and testing for acrylonitrile, benzene, coke oven emissions, ethylene oxide, isocyanates and vinyl chloride because these substances are generally associated with industrial sites and processes.

1.4 ASSESSMENT METHODOLOGY

The assessment is carried out systematically to include all accessible areas. Each room is assigned an identification number that, if provided, will coordinate with client identification number and name. Observations for suspect materials are recorded on a form designed specifically to meet the project requirements and obligations.

2.0 SURVEY FINDINGS

2.1 BUILDING DESCRIPTION

The Powder Magazine building is a one (1) storey complex constructed mainly of natural stone and brick.

Types of building finishes observed at the time of inspection and considered for the report include:

Floor: Hardwood floors throughout.

Walls: Walls are constructed of natural stone and brick.

Ceilings: Ceilings are constructed with stone.

Exterior: Finishes include natural stone and metal windows and doors.

Roof: The building roof is surfaced with copper roofing.

2.1.1 ASBESTOS

Materials potentially containing asbestos minerals were sampled and submitted to a laboratory for testing. Building materials considered for testing include:

HM-01: Parging Cement; HM-02: Mortar (Smooth); HM-03: Mortar (Textured)

Asbestos was not detected in any of the samples collected/analyzed.

2.1.2 LEAD

One (1) paint coating was sampled and submitted to a laboratory for testing. **Lead was detected** in the paint finish sampled.

2.1.3 MERCURY

One (1) paint coating was sampled and submitted to a laboratory for testing. **Mercury was detected** in the paint finish sampled.

2.1.4 ARSENIC

One (1) paint coating was sampled and submitted to a laboratory for testing. **Arsenic was not detected** in the paint finish sampled.

2.1.5 MOULD

No mould-damaged materials were observed by OESN at the time of evaluation.

2.1.6 CRYSTALLINE SILICA

Cement and concrete building materials were not sampled for the presence of crystalline silica. It is assumed that original concrete materials and mortar are silica-containing.

2.1.7 POLYCHLORINATED BIPHENYL (PCBs)

At the time of evaluation OESN did not observe lighting fixtures suspected to contain suspect PCB-containing power ballasts.

2.2.8 OZONE DEPLETING SUBSTANCES

Ozone depleting substances are used in many manufacturing applications including refrigeration and air conditioning units. At the time of evaluation OESN did not observe any units suspected to contain ozone depleting refrigerants.

2.2.9 BIOLOGICAL CONTAMINANTS

Biological contaminants such as animal fecal matter were not observed

.0 TEST RESULTS

3.1 ASBESTOS

The regulated limit for establishing asbestos content in materials in the Province of Ontario is 0.5% asbestos by dry weight¹. Test results for materials suspected of containing asbestos minerals are listed in Table 1.

Table 1: Asbestos Test Results

Sample Number	Material Number	Material Description	Regulated Limit	Result % by dry weight
Manufactured Materials				
00090.008-M01, M02, M03	HM-01	Parging Cement	0.5%	None Detected
00090.008-M04, M05, M06	HM-02	Mortar (Smooth)	0.5%	None Detected
00090.008-M07, M08, M09	HM-03	Mortar (Textured)	0.5%	None Detected

Refer to Appendix A (Photo Log) and Appendix C (Analytical Results).

3.2 ARSENIC, LEAD AND MERCURY IN PAINT FINISHES

During a renovation or demolition project governed by the Occupational Health & Safety Act/Regulations which involves paint finishes containing designated substances **at any concentration**, employers must comply with the Designated Substance Regulation if the work is likely to allow worker exposure. Consideration must be given to the activities being performed and their potential for generation of airborne particulate.

For this reason, surface coatings with results **above analytical detection limits** identified during this evaluation are reported as “positive” for the designated substance. Test results for paints suspected of containing arsenic, lead and mercury are listed in Table 2.

Table 2: Analytical Results for Arsenic, Lead, and Mercury.

Sample Number	Paint Finish Description	Interpretation of Analytical Result		
		Arsenic	Lead	Mercury
00090.008-P01	White Paint (Stone)	<MDL	POSITIVE	POSITIVE

Note: MDL = Method Detection Limit

Refer to Appendix B (Photo Log) and Appendix D (Analytical Results).

¹ Ontario Regulation 278/05 Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations

4.0 CONCLUSIONS

In preparation for renovations, the following designated substances and hazardous substances were identified and/or suspected:

- Lead and mercury is present in the paint coating sampled at levels that do not warrant consideration for workers protection if materials are disturbed.
 - 00090.008-P01 – White Paint (on stone)
- Silica (assumed present in concrete materials)

The information presented in this designated substance and hazardous materials survey is based on observations and analytical testing of bulk samples collected in reported project locations. It is possible that building materials not originally observed and subsequently not identified in this report may become exposed during renovation. Any materials not listed in this report and suspect to contain designated substances should be assumed until sampling and analysis is conducted.

5.0 RECOMMENDATIONS

Based on evaluation findings, OESN provides the following recommendations:

1. Provide this report to all staff and vendors (contractors) prior to any building maintenance or renovation activities.
2. Any materials not listed in this report and suspected to contain designated substances should be assumed positive until testing is conducted.
3. Disturbance of masonry products should be classified as a low, medium or high risk silica operations to determine appropriate respirators, measures, and procedures that should be followed. Silica related work to be completed in accordance with the Ministry of Labour's Health and Safety Guideline: *Silica on Construction Projects*.

Based on the preferred method for disturbance of masonry products, an action plan should be designed and prepared by the successful contractor to outline procedural steps for the protection of employees and the environment from Silica dust.




4. Prior to disposal of substrates (designated for landfill) with arsenic, mercury and lead-containing coatings, the substrates should be tested in accordance with Ontario Regulation 347 for purposes of waste streaming.

OESN recommends the following materials be tested for *Toxicity Characteristic Leaching Procedure (TCLP)* prior to landfill disposal (for specific parameters as outlined below).

- P01 - White - **Mercury TCLP**


Appendix A: Bulk Sample Material Photo Log

APPENDIX A – BULK SAMPLE MATERIAL PHOTO LOG

	<p>Sample Identification 00090.008-M01, M02, M03</p>
	<p>Sample Code HM-01</p>
	<p>Sample Location of Material Interior Vestibule</p>
	<p>Sample Description Parging Cement</p>
	<p>Sample Identification 00090.008-M04, M05, M06</p>
	<p>Sample Code HM-02</p>
	<p>Sample Location of Material Exterior</p>
	<p>Sample Description Mortar (Smooth)</p>
	<p>Sample Identification 00090.008-M07, M08, M09</p>
	<p>Sample Code HM-03</p>
	<p>Sample Location of Material Exterior</p>
	<p>Sample Description Mortar (Textured)</p>
<p>Analytical Result: None Detected</p>	

Appendix B: Paint Finishes Photolog

PAINT FINISHES (ARSENIC, LEAD, MERCURY)

	Sample Identification White Paint (on Stone) 00090.008-P01
	Arsenic Content <50 µg/g
	Lead Content 5 µg/g
	Mercury Content 2 µg/g

Appendix C: Asbestos Analytical Results

BULK SAMPLING METHODOLOGY

Bulk material samples are randomly collected during the assessment in strategic locations. Samples of materials suspected for containing asbestos minerals are collected by a knowledgeable, competent worker who is trained and experienced in asbestos bulk sampling. Safety measures are applied in accordance with OESN's Standard Operating Procedure (SOP).

Samples are representative of each homogeneous material (uniform in colour and texture) and the quantity of samples are collected in accordance with provincial regulation.

Table 1: Bulk Material Samples of O. Reg. 278/05 (as amended to 479/10).

Item	Type of Material	Size of homogeneous area	Minimum number of bulk material samples to be collected
1.	Surfacing material, including without limitation material that is applied to surfaces by spraying, by troweling or otherwise, such as acoustical plaster on ceilings and fireproofing materials on structural members	Less than 90 square metres	3
		90 or more square metres, but less than 450 square metres	5
		450 or more square metres	7
2.	Thermal insulation, except as described in item 3	Any size	3
3.	Thermal insulation patch	Less than 2 linear metres or 0.5 square metres any size	1
4.	Other material	Any size	3

Samples are tested using test method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials. June 1993. O. Reg. 278/05.

Sample locations drawings **are not** provided with this report, refer to the chain of custodies for sample locations.

The report of "suspect" materials is based on the field consultant's experience and knowledge regarding the historical use and applications of these chemicals in products. If observations do not confirm the presence of designated substances or hazardous materials, bulk samples of the material are collected and analyzed for the appropriate chemical or biological substance.

INTERPRETATION OF RESULTS

All bulk samples were analyzed using Polarized Light Microscopy (PLM) Method EPA 600/R93/116 and EPA 600/M4-82/020. The limit of quantitation for the test method is <1% asbestos by weight as determined by visual estimation.

Asbestos is present within the sample when the test result indicates a percentage of <1 to 100. A result reported as “<1% asbestos” indicates that trace amounts of asbestos were observed but could not be quantified by the test method. When this occurs, additional analysis can be requested to achieve a lower limit of quantitation.

A result reported as “None Detected” indicates that no traces of asbestos were observed in the sample. For most materials, a “None Detected” result can be interpreted as 0% asbestos. Due to the limitations of EPA 600 test method, non friable organically bound materials such as vinyl floor tiles can be difficult to analyze using PLM. For these materials, EPA recommends that a “None Detected” result be followed with analysis by Transmission Electron Microscopy (TEM) to confirm that asbestos is not present within the material.

The province of Ontario considers any material testing equal or greater than 0.5% by dry weight as asbestos.

September 3, 2019

Ontario Environmental & Safety Network, LTD.
RR #2 1783 Highway 20C
Allanburg, ON L0S 1A0

CLIENT PROJECT: 90.008
CEI LAB CODE: B195032

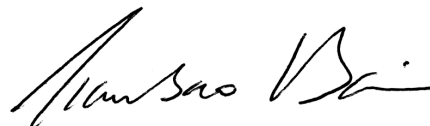
Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on August 26, 2019. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations.

Kind Regards,



Tianbao Bai, Ph.D., CIH
Laboratory Director

ASBESTOS ANALYTICAL REPORT

By: Polarized Light Microscopy

Prepared for

Ontario Environmental & Safety Network, LTD.

CLIENT PROJECT: 90.008

LAB CODE: B195032

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 09/03/19

TOTAL SAMPLES ANALYZED: 9

SAMPLES >1% ASBESTOS:



CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: 90.008

LAB CODE: B195032

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
90.008.M01		B76208	White,Tan	Cement	None Detected
90.008.M02		B76209	White,Tan	Cement	None Detected
90.008.M03		B76210	White,Tan	Cement	None Detected
90.008.M04		B76211	Gray	Mortar	None Detected
90.008.M05		B76212	Gray	Mortar	None Detected
90.008.M06		B76213	Gray	Mortar	None Detected
90.008.M07		B76214	Gray	Mortar	None Detected
90.008.M08		B76215	Gray	Mortar	None Detected
90.008.M09		B76216	Gray	Mortar	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Ontario Environmental & Safety Network, LTD.
 RR #2 1783 Highway 20C
 Allanburg, ON L0S 1A0

Lab Code: B195032
Date Received: 08-26-19
Date Analyzed: 08-28-19
Date Reported: 09-03-19

Project: 90.008

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous	Cellulose	Non-Fibrous		
90.008.M01 B76208	Cement	Heterogeneous	<1%	Cellulose	35%	Calc Carb	None Detected
		White, Tan			60%	Binder	
		Non-fibrous			5%	Paint	
		Bound					
90.008.M02 B76209	Cement	Heterogeneous	<1%	Cellulose	35%	Calc Carb	None Detected
		White, Tan			60%	Binder	
		Non-fibrous			5%	Paint	
		Bound					
90.008.M03 B76210	Cement	Heterogeneous	<1%	Cellulose	35%	Calc Carb	None Detected
		White, Tan			60%	Binder	
		Non-fibrous			5%	Paint	
		Bound					
90.008.M04 B76211	Mortar	Heterogeneous	<1%	Cellulose	60%	Silicates	None Detected
		Gray			40%	Binder	
		Non-fibrous					
		Tightly Bound					
90.008.M05 B76212	Mortar	Heterogeneous	<1%	Cellulose	60%	Silicates	None Detected
		Gray			40%	Binder	
		Non-fibrous					
		Tightly Bound					
90.008.M06 B76213	Mortar	Heterogeneous	<1%	Cellulose	60%	Silicates	None Detected
		Gray			40%	Binder	
		Non-fibrous					
		Tightly Bound					
90.008.M07 B76214	Mortar	Heterogeneous	<1%	Cellulose	60%	Silicates	None Detected
		Gray			40%	Binder	
		Non-fibrous					
		Tightly Bound					

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Ontario Environmental & Safety Network, LTD.
 RR #2 1783 Highway 20C
 Allanburg, ON L0S 1A0

Lab Code: B195032
Date Received: 08-26-19
Date Analyzed: 08-28-19
Date Reported: 09-03-19

Project: 90.008

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous	Non-Fibrous			
90.008.M08 B76215	Mortar	Heterogeneous	<1%	Cellulose	60%	Silicates	None Detected
		Gray			40%	Binder	
		Non-fibrous Tightly Bound					
90.008.M09 B76216	Mortar	Heterogeneous	<1%	Cellulose	60%	Silicates	None Detected
		Gray			40%	Binder	
		Non-fibrous Tightly Bound					

LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
Non-Trem = Non-Asbestiform Tremolite
Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORTING LIMIT: <1% by visual estimation

REPORTING LIMIT FOR POINT COUNTS: 0.25% by 400 Points or 0.1% by 1,000 Points

REGULATORY LIMIT: >1% by weight

Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. *Estimated measurement of uncertainty is available on request.*

This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by Eurofins CEI. Eurofins CEI makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.

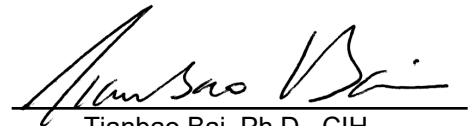
Information provided by customer includes customer sample ID, location, volume and area as well as date and time of sampling.

ANALYST:



Kathryn Wescott

APPROVED BY:



Tianbao Bai, Ph.D., CIH
Laboratory Director



Megan Fisher

B195032

B76208-B76216

Chain of Custody Record

COC 1 of 1

9

Laboratory: CEI										
Sample Date: August 23, 2019			Job Number: 90.008							
Quotation#:					Analysis					
Job Reference: Fort George Powder Magazine					PLM Bulk	PLM Point Count	PLM Gravimetric	TEM Bulk	Lead	Results By:
Contact Name: Lisa Tappay										
Contact Email: Ltappay@oesn.net										
HM #	Sample #	Sample ID	Location							
HM-01	90.008.M01	Parging Cement	Interior vestibule	X						<input type="checkbox"/> 4 hour <input type="checkbox"/> 24 hour <input type="checkbox"/> 2 B Days <input type="checkbox"/> 3 B Days <input checked="" type="checkbox"/> 5 B Days <input type="checkbox"/> Other:
HM-01	90.008.M02	Parging Cement	Interior vestibule	X						
HM-01	90.008.M03	Parging Cement	Interior vestibule	X						
HM-02	90.008.M04	Mortar (smooth)	Exterior	X						
HM-02	90.008.M05	Mortar (smooth)	Exterior	X						
HM-02	90.008.M06	Mortar (smooth)	Exterior	X						
HM-03	90.008.M07	Mortar (textured)	Exterior	X						
HM-03	90.008.M08	Mortar (textured)	Exterior	X						
HM-03	90.008.M09	Mortar (textured)	Exterior	X						
Comments:				Method of Delivery:		<input checked="" type="checkbox"/> Positive stop on analyses identified above with ^{1*}			Total # samples shipped: 9	
Relinquished By (Print & Sign): Madison Easterbrook <i>M. Easterbrook</i>			Received by Driver/Depot: EUROFINS CEI, INC SAMPLES ACCEPTED <i>MM</i>			Received at Lab: <i>MM</i> 8-26-19 9:00			Verified By:	
Date/Time: 8/23/2019 11:18AM			Date/Time: _____			Date/Time: _____			Date/Time: _____	



Ontario Environmental & Safety Network Ltd.

Appendix D: Paint Finishes Analytical Results

SAMPLING METHODOLOGY PAINT COATINGS (Lead, Mercury, Arsenic)

Paints observed during the time of inspection were bulk sampled and sent to an accredited laboratory for analysis.

Each sample container is labeled with a sticker detailing the information (e.g. sample number, name, color description, room location) specific for that sample.

All samples are recorded on a Chain of Custody and sent to an accredited laboratory for analysis of Arsenic, Lead and Mercury.

For the determination of metals (arsenic, lead) in paint coatings U.S. Environmental Protection Agency test method EPA 6020 – Digestion, ICP-MS was applied.

For the determination of mercury in paint coatings U.S. Environmental Protection Agency test method EPA 7471B – CVAA, digestion was applied.

Sample locations drawings **are not** provided with this report, refer to the chain of custodies for sample locations.

INTERPRETATION OF RESULTS

Regulated provincial limits for defining whether a surface coating is lead, arsenic or mercury “containing” do not currently exist; industry best practice dictates that consideration needs to be given to surface coatings containing any level of these contaminants for worker health and safety. The Ontario Ministry of Labour does not consider whether a surface coating is “lead-based” or “lead-containing” within the Occupational Health & Safety Act & Regulations; instead the focus is on whether workers may be exposed to lead or another designated substance, whatever the source.¹

United States Legislation References

Within the United States, the Housing and Urban Development and the Consumer Products Safety Commission (CPSC) have designated levels of lead in paint below which they consider the paint to be non-lead containing.² These include:

	Definition
Lead-based	≥ 5000 ppm by weight
Lead-containing	> 90 ppm by weight

The U.S. OSHA has stated that they do not recognize these levels as safe under most workplace situations; and that for the purposes of occupational health, these levels may easily present an exposure hazard.³

Canadian Legislation References

The Federal Surface Coating Materials Regulations⁴ prescribes maximum concentrations for total lead and total mercury present in consumer paints and other surface coatings, applicable to the advertising, sale and importation of these materials as well as furniture and other articles for children; and is intended to protect consumers. These limits are:

	Limit ⁵
Lead	90 mg/kg
Mercury	10 mg/kg

¹ Ontario Regulation 490/09 Designated Substances under Occupational Health and Safety Act, R.S.O. 1990, c. O.1 (as amended).

² U.S. Department of Housing & Urban Development. Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing. Office of Healthy Homes and Lead Hazard Control, 2nd ed. July 2012.

³ Occupational Safety and Health Administration. Standard Interpretations, Standard number 1926.62. https://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=INTERPRETATIONS&p_toc_level=3&p_key_value=1926.62&p_status=CURRENT

⁴ Surface Coating Materials Regulations SOR/2005-109 (June 2011) under Canada Consumer Product Safety Act and pursuant to Section 5 of the Hazardous Products Act (R.S., c.24 (3rd Suppl), s.1).

⁵ mg/kg = µg/g = ppm

In the absence of Ontario Ministry of Labour regulatory direction on the definition of a “lead-containing” or “mercury-containing” material, the Federal Surface Coating Materials Regulations limits have been routinely used in Canada as practical values which, when exceeded, worker exposure precautions were recommended. However, in the interest of protecting worker health and safety, industrial hygiene best practice dictates that any coating identified with lead, arsenic or mercury above analytical detection limits should be considered lead-, arsenic- or mercury-containing.

Certificate of Analysis

Ontario Environmental & Safety Network Ltd. (St.)

184 Scott Street, Unit 8 & 9
St. Catharines, ON L2N 1H1
Attn: Lisa Tappay

Client PO: 00090.008
Project: Powder Magazine
Custody: 47764

Report Date: 29-Aug-2019
Order Date: 26-Aug-2019

Order #: 1935067

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Parcel ID	Client ID
1935067-01	90.008 White paint on stone

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Ontario Environmental & Safety Network Ltd. (St.)
Client PO: 00090.008

Report Date: 29-Aug-2019

Order Date: 26-Aug-2019

Project Description: Powder Magazine

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Mercury by CVAA	EPA 7471B - CVAA, digestion	29-Aug-19	29-Aug-19
Metals, ICP-MS	EPA 6020 - Digestion - ICP-MS	27-Aug-19	27-Aug-19

Certificate of Analysis
 Client: Ontario Environmental & Safety Network Ltd. (St.)
 Client PO: 00090.008

Report Date: 29-Aug-2019

Order Date: 26-Aug-2019

Project Description: Powder Magazine

Client ID:	90.008 White paint on stone	-	-	-
Sample Date:	23-Aug-19 11:30	-	-	-
Sample ID:	1935067-01	-	-	-
MDL/Units	Paint	-	-	-

Metals

Arsenic	50 ug/g	<50	-	-	-
Lead	5 ug/g	5	-	-	-
Mercury	2 ug/g	2	-	-	-

Certificate of Analysis
 Client: Ontario Environmental & Safety Network Ltd. (St.)
 Client PO: 00090.008

Report Date: 29-Aug-2019

Order Date: 26-Aug-2019

Project Description: Powder Magazine

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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Metals

Arsenic	ND	50	ug/g						
Lead	ND	5	ug/g						
Mercury	ND	2	ug/g						

Certificate of Analysis
 Client: Ontario Environmental & Safety Network Ltd. (St.)
 Client PO: 00090.008

Report Date: 29-Aug-2019

Order Date: 26-Aug-2019

Project Description: Powder Magazine

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Arsenic	ND	50	ug/g	ND			0.0	50	
Lead	5.2	5	ug/g	ND			0.0	50	
Mercury	3	2	ug/g	2			2.1	30	

Certificate of Analysis
 Client: Ontario Environmental & Safety Network Ltd. (St.)
 Client PO: 00090.008

Report Date: 29-Aug-2019

Order Date: 26-Aug-2019

Project Description: Powder Magazine

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Arsenic	52.5		ug/L	ND	105	70-130			
Lead	47.1		ug/L	ND	93.8	70-130			
Mercury	4		ug/L	ND	103	70-130			

Certificate of Analysis
Client: Ontario Environmental & Safety Network Ltd. (St.)
Client PO: 00090.008

Report Date: 29-Aug-2019
Order Date: 26-Aug-2019
Project Description: Powder Magazine

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.



Chain of Custody
(Lab Use Only)
No 47764

Page 1 of 1
Turnaround Time:
 1 Day 3 Day
 2 Day Regular
Date Required: _____

Client Name: <u>OESN</u>	Project Reference: <u>Powder Magazine</u>
Contact Name: <u>Lisa Tappay</u>	Quote #
Address: <u>184 Scott St. St Catharines, ON</u>	PO # <u>00090.008</u>
Telephone: <u>905-988-1554</u>	Email Address: <u>Ltappay@oesn.net</u>

Criteria: O. Reg. 153/04 (As Amended) Table ___ RSC Filing O. Reg. 558/00 PWQO CCME SUB (Storm) SUB (Sanitary) Municipality: _____ Other: _____

Matrix Type: S (Soil Sed.) GW (Ground Water) SW (Surface Water) SS (Storm Sanitary Sewer) P (Paint) A (Air) O (Other) **Required Analyses**

Parcel Order Number: <u>1935067</u>		Matrix	Air Volume	# of Containers	Sample Taken		Lead	Mercury	Arsenic									
Sample ID/Location Name					Date	Time												
1	<u>90.008 White paint on stone</u>	<u>P</u>	<u>-</u>	<u>1</u>	<u>8/23/2019</u>	<u>11:30</u>	<u>X</u>	<u>X</u>	<u>X</u>									
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments: _____ Method of Delivery: Fed Ex

Relinquished By (Sign): <u>Madison Easterbrook</u>	Received by Driver/Depot:	Received at Lab: <u>Sumeeporn Bkmai</u>	Verified By: <u>Madison Easterbrook</u>
Relinquished By (Print): <u>Madison Easterbrook</u>	Date/Time:	Date/Time: <u>AUG 26, 2019 10:50</u>	Date/Time: <u>8-26-19/3:46</u>
Date/Time: <u>August 23, 2019 11:30 AM</u>	Temperature: _____ °C	Temperature: _____ °C	pH Verified By: _____

Appendix E: References

REFERENCES

This designated substance assessment was prepared referencing laws and guidelines cited below.

1. Ontario Occupational Health & Safety Act, R.S.O. 1990 c.01.
2. Ontario Regulation for Construction Projects 213/91 as amended.
3. Ontario Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations 278/05 as amended.
4. Ontario Regulation for Designated Substances 490/09 as amended.
5. U.S. Department of Housing & Urban Development. Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing. Office of Healthy Homes and Lead Hazard Control, 2nd ed. July 2012.
6. Occupational Safety and Health Administration. Standard Interpretations, Standard number 1926.62.
7. Surface Coating Materials Regulations SOR/2005-109 (June 2011) under Canada Consumer Product Safety Act and pursuant to Section 5 of the Hazardous Products Act (R.S., c.24 (3rd Supp.), s.1).
8. R.R.O. 1990, Regulation 347 General – Waste Management under Environmental Protection Act (as amended).
9. Ontario Ministry of the Environment and Climate Change. Registration Guidance Manual for Generators of Liquid Industrial and Hazardous Waste (January 2016).

Appendix F: Limitations

Results are submitted pursuant to OESN's current terms and conditions of sale, including the company's standard warrant and limitation of liability provisions; and no responsibility is assumed for the manner in which the results are used or interpreted.

The findings and conclusions presented in this report were based, in part, on visual observations of the building. Our conclusions cannot and are not extended to include those portions of the building which were not reasonably available, in OESN's opinion, for direct observation.

Where testing was performed, it was carried out in accordance with the scope of our contract. Due to a possible lack of information, OESN reserves the right to modify any part of the assessment regarding the materials within the building. It should be noted that this report was not exhaustive for every possible contaminant and therefore other compounds or materials may be present in the site environment.

This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which a third party makes of the report, in whole or in part, or any reliance thereon, or decisions made based on any information or conclusions in the report, is the sole responsibility of such third party.

OESN accepts no responsibility whatsoever for damages or loss of any nature suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report.

Please feel free to contact our office if there are any questions regarding the content of this report,
1 888 271 2111.