Stantec Consulting Ltd.
102-40 Highfield Park Drive, Dartmouth NS B3A 0A3

March 30, 2016
File: 121414118

Attention: Ms. Marcia Johannesen
Senior Environmental Specialist, Environmental Services
Public Works and Government Services Canada
1 Regent Square, Suite 204
Corner Brook, NL, A2H 7K6

Dear Ms. Johannesen,

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

INTRODUCTION

At the request of Public Works and Government Services Canada (PWGSC), on February 15, 2016, Stantec Consulting Ltd. (Stantec) completed a hazardous building materials assessment of the Cape Sable Island Lighthouse (subject building) located in Shelburne County, Nova Scotia.

The purpose of the assessment was to confirm the presence or absence of pre-determined building materials, which would require specific abatement or disposal requirements prior to the upcoming renovation activities. The assessment was conducted to identify the nature, location, condition and amount of asbestos-containing materials (non-friable and friable), polychlorinated biphenyls (PCBs) in electrical equipment, mercury-containing equipment, and lead-containing materials that may be present within the building.

Based on visual observations and experience with known hazardous materials, various samples of potential hazardous materials were collected for analysis of asbestos and lead content.

BACKGROUND AND SCOPE OF WORK

The Cape Sable Island Lighthouse is located offshore approximately 5 kilometers southeast of the Clark's Harbour wharf, Nova Scotia. The lighthouse does not house permanent residences, however it is frequented by government workers and contractors. Based on the information provided by PWGSC, the subject light tower has been designated for rehabilitation, which will include rebuilding the concrete structures (exterior stairs, concrete walls and floors), replacement of the gallery railings, restoration of ladders and railings, repainting interior finishes and framing and the restoration of the lantern interior.

The subject building consists of a tapered octagonal tower with a cast-in concrete base, concrete shell and metal framed windows. The lantern gallery consists of a metal framed structure with single glazed metal-framed windows and a metal roof.

Electric heating is provided to the building through a wall-mount radiator.

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

The lighthouse was constructed in 1861. Other than the addition of the existing concrete structure of the lighthouse in the 1920s, no major renovations were reported.

The following reports were provided for review:

- Survey for Mercury in Nova Scotia Lighthouses (July-August 2002), Prepared by Health Canada Workplace Health and Public Safety Programme dated December 5, 2002.
- Final Phase I and II Environmental Site Assessment, Cape Sable Lightstation, Shelburne County, NS. Prepared for Public Works and Government Services Canada for Fisheries and Oceans Canada by MGI Limited dated February 2004, File 20864A.
- Phase III Environmental Site Assessment Canadian Coast Guard Lightstation (LL No. 327), Cape Sable Island, NS. Prepared for Department of Fisheries and Oceans by Stantec dated December 12, 2007, File 323408.
- Final Phase III Environmental Site Assessment and Human Health and Ecological Risk Assessment, Cape Sable Lightstation (LL No. 327), Shelburne County, NS. Prepared for Public Works and Government Services Canada for Fisheries and Oceans Canada by Dillon Consulting Limited dated March 2011, File 11-4458-1000.
- Remediation Planning Inspection and Remedial Action Plan, Cape Sable Island Lightstation, Shelburne County, NS. Prepared by SNC-Lavalin Environment dated March 2012, File 503448-0038.
- Environmental Closure Report, Cape Sable Island Lightstation (LL No. 327), Shelburne County, NS. Prepared by Stantec dated March 27, 2013.

The 2002 Health Canada report identified mercury vapours in the upper levels of the lightstation using a direct reading monitor. Based on a review of the above reports, building material sampling of the light tower with asbestos and lead paint analysis was insufficient to adequately assess the presence of these materials in the light tower.

The scope of work for the hazardous building materials assessment of the light tower included the following:

- Collecting representative samples of suspected ACMs and lead-based paint;
- Quantifying suspect PCB and mercury containing equipment;
- Analyzing (by lab) samples of suspect ACMs and lead-based paint;
- Determining the locations and extent of identified ACMs and lead-based paint;
- Developing specifications for removal and handling of hazardous materials for use in a renovation tender document (SPECs are reported under separate cover); and
- Preparing this letter report for the subject building.

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

REFERENCE DOCUMENTATION

Reference Documentation on asbestos-containing materials, lead-containing building materials, lead-based paint, mercury-containing materials, and PCBs, is provided in Attachment A.

HAZARDOUS MATERIALS ASSESSMENT

Suspected hazardous materials were identified, based on visual observations and our experience with known hazardous materials. Representative bulk samples of suspected ACMs and paint samples were collected. Sampling locations and descriptions were recorded. Photographs were taken of various materials and sample locations. A selection of photos for the Site is presented in Attachment B.

Based on visual observations and our experience with known hazardous materials, various samples were collected for later analysis, and field notes documented the observations of the assessment.

ASBESTOS SAMPLING

Suspected ACM bulk samples were collected by hand using clean tools; placed in clean plastic bags; and transported by courier to EMSL Canada for analysis. EMSL Canada is certified under the National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos analysis. Samples were analyzed by either Polarized Light Microscopy (PLM) or Non-Friable Organically Bound (NOB) Materials by PLM, determined by the friability of each specific sample.

Multiple (three) samples of each visually similar material were collected. The positive result of any one sample dictates that the group of visually similar material be classified as an ACM. Thus, the laboratory discontinued analysis when asbestos was identified in one of the visually similar samples. The laboratory reported the subsequent samples as "Positive Stop (Not Analyzed)".

Asbestos Assessment Results and Recommendations

Stantec collected a total of nine bulk samples, three samples of each suspected ACM in the subject building. A summary of the sampling locations and analytical results is discussed below. The laboratory analytical results are presented in Attachment C.

Analytical results indicate that 2% Chrysotile asbestos was detected in the drywall joint compound located in the base level mechanical room (BS-CSIL-01A) and 2nd level operations room (BS-CSIL-03A). The drywall joint compound in the 2nd level operations room was observed to be in poor condition at the time of the assessment with debris observed on the floor areas.

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

Asbestos was not detected in the asphalt shingle (red) located on the main level mechanical room ceiling (BS-CSIL-02A/B/C).

All asbestos containing materials identified in the subject building must be handled in accordance with the Nova Scotia Asbestos Waste Management Regulation, N.S. Reg. 53/95 and manifested as a Dangerous Good before transport. Should any other material(s) suspected to contain asbestos, be uncovered during renovation activities, work must stop, and the material(s) tested to determine whether asbestos is present.

PAINT SAMPLING

Bulk paint samples were collected using clean tools to cut a representative sample of each surface, as required. For each sampling location, a sample of paint chips and/or paint with substrate was collected (including all layers of paint where possible). Each sample was stored in a clean plastic bag and transported by courier to Maxxam Analytics (Maxxam) in Bedford, NS, to be analyzed for lead with selected samples analyzed for lead leachate.

Stantec collected a total of seven paint samples from the subject building. A summary of the sampling locations and analytical results is presented below. Where sampling substrate material was limited (*i.e.* metal surfaces), only paint chips were collected. The laboratory results are presented in Attachment D. Laboratory analytical duplicates were performed on several samples, which correlate with the results of the original samples. The condition of the paint was noted during the assessment and all paints that were sampled were observed to be in fair-to-poor condition.

Paint Assessment Results and Recommendations

Lead Content

Lead was detected at concentrations above the laboratory detection limit, but below the federal Surface Coating Materials Regulation (90 mg/kg):

Paint Chips:

- PS-CSIL-05 (17 mg/kg): White paint on interior drywall in 2nd level operations room; and
- PS-CSIL-07 (67 mg/kg): White paint on exterior concrete;

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

Lead was detected at concentrations above the federal Surface Coating Materials Regulation (90 mg/kg), but below the NS landfill disposal guideline (1,000 mg/kg) in the following paint sample:

Paint Chips:

- PS-CSIL-04 (740 mg/kg): Gray paint on interior wood window trim in the 2nd level operations room.

Lead was detected at concentrations above the NS landfill disposal guideline (1,000 mg/kg) in the following paint samples:

Paint Chips:

- PS-CSIL-01 (1,200 mg/kg): Gray paint over pale green paint on interior base level mechanical room floor;
- PS-CSIL-02 (42,000 mg/kg): Red paint on interior metal ladders and railings;
- PS-CSIL-03 (28,000 mg/kg): Red paint on interior concrete floors on all levels; and
- PS-CSIL-06 (55,000 mg/kg): White paint on wood trim in the interior lantern gallery.

These paints are considered to be lead-containing and appropriate worker protection in accordance with the NS Labour and Workforce Development Code of Practice for Working with Inorganic Lead is required when disturbing this material. During renovation lead concentrations in air should not exceed the ACGIH TWA-TLV of 0.05 mg/m^3. It is anticipated that following industry standard methods, abatement of the lead-based paint using Minimum Precautions is required. The lead-based paint abatement must only occur after the mercury abatement is completed.

The above-noted samples were submitted to Maxxam for lead leachate analysis (with substrate where available) to confirm disposal requirements.

Lead Leachate Results

Lead leachate was detected at concentrations below the landfill leachate disposal guideline (5 mg/L) in the following samples:

Paint Chips:

- PS-CSIL-01 (0.43 mg/L): Gray paint over pale green paint on interior base level mechanical room floor;
- PS-CSIL-04 (0.093 mg/L): Gray paint on interior wood window trim in the 2nd level operations room;

- PS-CSIL-05 (0.0085 mg/L): White paint on interior drywall in 2nd level operations room; and
- PS-CSIL-07 (0.019 mg/L): White paint on exterior concrete.

Paint + Substrate:

- PS-CSIL-04 (0.023 mg/L): Gray paint on interior wood window trim in the 2nd level operations room; and
- PS-CSIL-05 (0.083 mg/L): White paint on interior drywall in 2nd level operations room.

Analysis of the samples confirmed the paint samples listed above are suitable for disposal at an approved solid waste landfill or C&D facility pending final authorization from the facility operator.

Lead leachate was detected at concentrations above the landfill leachate disposal guideline (5 mg/L) in the following samples:

Paint Chips:

- PS-CSIL-02 (36 mg/L): Red paint on interior metal ladders and railings;
- PS-CSIL-03 (110 mg/L): Red paint on interior concrete floors on all levels; and
- PS-CSIL-06 (59 mg/L): White paint on wood trim in the interior lantern gallery.

Analysis of the samples confirmed that the paint chips and paint plus substrate samples listed above exceed the allowable leachate concentration of 5 mg/L. Out of province disposal at an approved facility capable of accepting lead leachate toxic wastes is required.

PCB-Containing Equipment Identification and Recommendations

An assessment for equipment likely to contain PCBs was completed within the subject building. Information on the type of and quantity of equipment was recorded, where available.

Five suspected PCB-containing lamp ballasts were observed in the subject building at the time of the assessment. These lamp ballasts were Canadian General Electric "Gold Label" models with a model code of "17A240T", which indicates that PCBs may be present based on the Environment Canada document "Identification of Lamp Ballasts Containing PCBs." The light fixtures were energized at the time of the assessment and the date codes on the back of the ballast casings could not be accessed to confirm the manufacture date. When decommissioned, these date codes should be checked to confirm whether or not PCBs are present within the lamp ballasts.

Should any equipment suspected of containing PCBs be uncovered during future renovation or demolition activities, they should be removed from service and properly disposed of to avoid the release of PCBs into the environment.

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

Mercury-Containing Equipment Identification and Recommendations

An assessment for equipment likely to contain mercury was completed within the subject building. No mercury-containing equipment was observed at the facility at the time of the assessment.

Previous surveys performed by Health Canada document the presence of elemental mercury in vapour and liquid form located on the 3rd, 4th, 5th and 6th levels. The contamination is a result from vapours (evaporation) and spills associated with the former liquid mercury bath in which the beacon was floated that functioned as a bearing for movement.

Mercury abatement should be conducted prior to all other abatement activities due to the occupational exposure to vapours resulting from residual mercury contamination. Mercury abatement is defined as primary work involving the containment, controlled removal, treatment of mercury, or mercury-containing materials. Mercury abatement will need to be conducted to remove mercury in droplet form and contain/suppress mercury vapours.

CONCLUSIONS

The purpose of the work was to assess areas of the subject building that will be disturbed during renovation activities, and identify the presence and locations of hazardous material.

Based on the findings and observations from the assessment, ACMs, lead-containing and lead leachate toxic paint, and PCB-containing equipment were identified in the subject building. Based on the 2002 Health Canada report, mercury is also present in building materials throughout the upper levels of the light tower.

Findings, observations and recommendations associated with the hazardous materials assessment completed in the subject building are summarized Table 1.

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

Table 1 Summary of Findings and Recommendations

Hazard	Material Identified	Quantity	Recommendations
Non-Friable Asbestos	Asbestos was detected in drywall joint compound located in the base level mechanical room and the 2nd level operations room. The drywall joint compound in the 2nd level operations room was observed to be in poor condition at the time of the assessment with debris observed on the floor areas.	Approximately 55 m^2	Based on the identification of non-friable ACMs in the lighthouse, asbestos abatement Minimum Precautions (Type II) must be followed for removal of the drywall joint compound. All asbestos containing materials identified in the subject building must be handled in accordance with the Nova Scotia Asbestos Waste Management Regulation, N.S. Reg. 53/95 and manifested as a Dangerous Good before transport. Should any other material(s) suspected of containing asbestos, be uncovered during renovation activities, work must stop, and the material(s) tested to determine whether asbestos is present.
Lead-based Paint	All paint was observed to be in fair-to-poor condition at the time of the assessment. Lead was detected at concentrations above the laboratory detection limit but below the federal Surface Coating Materials Regulation (90 mg/kg): • White paint on interior drywall in 2nd level operations room (paint chips). • White paint on exterior concrete (paint chips).	Not quantified	Appropriate worker protection is required when disturbing these materials. During renovation lead concentrations in air should not exceed the ACGIH TWA-TLV of 0.05 mg/m^3. It is anticipated that following industry standard methods, abatement of the lead-based paint using Minimum Precautions is required. The lead-based paint abatement should only occur after the mercury abatement is completed. This material must be handled appropriately, packaged and sent to a disposal facility out-of-province based on the lead leachate results.

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

Table 1 Summary of Findings and Recommendations

Hazard	Material Identified	Quantity	Recommendations
Lead-based Paint	Lead was detected at concentrations above the federal Surface Coating Materials Regulation (90 mg/kg) but below the NS landfill disposal guideline (1,000 mg/kg) in the following paint sample: • Gray paint on interior wood window trim in the 2nd level operations room (paint chips). Lead was detected at concentrations above the NS landfill disposal guideline (1,000 mg/kg) in the following paint samples: • Gray paint over pale green paint on interior base level (paint chips)mechanical room floor. • Red paint on interior metal ladders and railings (paint chips). • Red paint on interior concrete floors on all levels (paint chips). • White paint on wood trim in the interior lantern gallery (paint chips). Lead leachate was detected at concentrations below the landfill leachate disposal guideline (5 mg/L) in the following samples: • Gray paint over pale green paint on interior base level mechanical room floor (paint chips). • Gray paint on interior wood window trim in the 2nd level operations room (paint chips).	Not quantified	Paint chips and paint plus substrate samples that exceed a 5 mg/L Pb leachate concentration, require out of province disposal at an approved facility capable of accepting lead leachate toxic waste. The remaining paint chips and paint plus substrate samples below the landfill disposal guidelines are suitable for disposal at an approved solid waste landfill or C&D facility pending final authorization from the facility operator.

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

Table 1 Summary of Findings and Recommendations

Hazard	Material Identified	Quantity	Recommendations
Lead-based Paint	• White paint on interior drywall in 2nd level operations room (paint chips). • White paint on exterior concrete (paint chips). • Gray paint on interior wood window trim in the 2nd level operations room (paint + substrate). • White paint on interior drywall in 2nd level operations room (paint + substrate). Lead leachate was detected at concentrations above the landfill leachate disposal guideline (5 mg/L) in the following samples: • Red paint on interior metal ladders and railings (paint chips). • Red paint on interior concrete floors on all levels (paint chips). • White paint on wood trim in the interior lantern gallery (paint chips).	Not quantified	
PCBs	Fluorescent lamp ballasts	5	Check ballasts for PCB content with Environment Canada Identification of lamp ballasts containing PCBs. Remove PCB-containing ballasts prior to demolition activities. Ensure PCB-containing ballasts remain intact to limit worker exposure. Once removed, place in sealed containers and dispose of PCB-containing ballasts at an approved disposal facility.

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

Table 1 Summary of Findings and Recommendations

Hazard	Material Identified	Quantity	Recommendations
Mercury	Previous surveys performed by Health Canada document the presence of elemental mercury in vapour and liquid form located on most levels of the lighthouse.	3rd, 4th, 5th, and 6th levels	Mercury abatement should be conducted prior to all other abatement activities due to the occupational exposure to vapours resulting from residual mercury contamination. Mercury abatement is defined as primary work involving the containment, controlled removal, treatment of mercury, or mercury-containing materials. Mercury abatement shall be conducted to remove mercury in droplet form and contain/suppress mercury vapours. Appropriate worker protection is required when disturbing these materials. During renovation lead concentrations in air should not exceed the ACGIH TWA-TLV of 0.025 mg/m^3.

CLOSURE

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (*e.g.*, utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

Reference: Limited Hazardous Building Materials Assessment, Cape Sable Island Lighthouse, Shelburne County, Nova Scotia, DFRP #02298, LL# 327, RPIS# MC 00086

This report was prepared by Don Hartt, B.Sc., and reviewed by Clayton Barclay, Ph.D., P.Eng.

Regards,

STANTEC CONSULTING LTD.

Don Hartt, B.Sc.
Environmental Scientist
Phone: 902-468-7777
don.hartt@stantec.com

Clayton Barclay, Ph.D., P.Eng.
Senior Technical Review
Phone: 506-452-7000
clayton.barclay@stantec.com

Attachment:
A Reference Document
B Photo Log
C Laboratory Certificate - Asbestos
D Laboratory Certificate - Lead in Paint

hd v:\1214\active\121414118\05_report _deliverable\deliverable\hazmat _cape sable\rpt_fin_121414118_hazmat_cape_sable_20160329.docx

Attachment A
Reference Documentation

ASBESTOS-CONTAINING MATERIALS

Asbestos is a name of naturally occurring silicate minerals with similar chemical and physical properties. Known for its durability, strength, chemical and fire resistance, asbestos was mined and used extensively from the early 1900s until the 1970s. Between the 1970s and late 1980s the use of asbestos was largely phased out in common building materials with limited use in roofing materials, tars and cement based products.

Asbestos fibres are known to cause health effects in workers exposed to asbestos over an extended period of time. Based on the known health risks associated with asbestos, regulatory control of asbestos in the workplace is the responsibility of Nova Scotia Labour and Advanced Education (NSLAE) under the provisions of the Occupational Health and Safety Act. For the purposes of managing worker exposure during building maintenance, renovation and demolition, the Department defines an ACM as "a material which contains greater than 0.5% asbestos by volume". The Act, Regulations and Codes of Practice have established procedures for safe monitoring and abatement as well as the specific responsibilities of owners, employers, and employees. Some of the provincial Codes of Practice, Guidelines and Regulations pertaining to asbestos are presented below:

- Guidelines for Outdoor Work with Asbestos, March 26, 1998;
- A Guide to Assessment and Management of Asbestos in the Workplace, November 21, 2013;
- A Guide to Removal of Friable Asbestos Containing Material, November 21, 2013; and
- Dealing with Asbestos Containing Materials-An Information Package, July 1988.

Nova Scotia Environment (NSE) regulates the disposal of certain ACMs under the *Asbestos Waste Management Regulations* (April 11, 1995). Under the Regulations, "asbestos waste" refers to a friable waste material containing asbestos fibres or asbestos dust in a concentration greater than 0.5% by weight. Friable refers to a material that when dry can be crumbled, pulverized, or reduced to powder by hand pressure. Such materials must be managed and/or removed in accordance with the requirements of the regulations and disposed at approved disposal facilities.

In Nova Scotia, the disposal of non-friable ACM is generally considered to be as a construction and demolition waste. Some Construction and Demolition (C&D) Debris Disposal Sites accept non-friable ACM waste, others do not (*i.e.*, it appears to be up to the operators' discretion). There are designated asbestos waste disposal facilities in Nova Scotia that accept both friable and non-friable ACMs.

The *Canada Occupational Health and Safety Regulations* indicate that an employee shall be kept free from exposure to a concentration of airborne chrysotile asbestos in excess of one fibre per cubic centimeter (f/cc).

The NS *Occupational Health Regulations* reference the most recent American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values-Time-Weighted Average (TLVs-TWA). From the ACGIH documentation, TWA concentration is based on "…a conventional 8-hour day and a 40-hour work week, to which it is believed that nearly all workers may be repeatedly exposed…" For asbestos, the TLV-TWA is 0.1 f/cc as published by ACGIH.

The NS Guide to Removal of Friable Asbestos Containing Material published by NSLAE recommends 0.01 f/cc be used as a guideline for asbestos in air for monitoring in an indoor area outside of an enclosure during asbestos abatement work and clearance testing inside an enclosure post-abatement.

LEAD-CONTAINING BUILDING MATERIALS

Lead in structures is commonly associated with lead added to paint, lead solder on pipes, lead seals on bell and gasket joint, lead flashing on roofing and lead in settled dust. The recognized hazards associated with lead initiated a number of changes in the availability of products with lead. The hazards of lead have been recognized since the early 1900s and since then the lead concentration in products has been decreasing.

LEAD-BASED PAINT

NSLAE and NSE regulate the maintenance and removal of lead through various guidelines and Codes of Practice which are similar to those for asbestos. For renovation/demolition involving potential lead-containing substances (such as paint), the substances must be tested to determine lead concentrations. The substance may consist of paint and substrate if the paint is in good condition, or of paint chips only, if the paint is peeling or in poor condition. If the lead concentration exceeds 0.1% by weight (*i.e.* 1,000 mg/kg), the material is classified as a "lead-containing material" and must be handled and removed in accordance with NSLAE's "Code of Practice for Working with Inorganic Lead". Where the lead content of a material is above 1,000 mg/kg, the use of appropriate personal protective equipment is required when disturbing the material, for example during renovation or demolition activities, in particular activities that involve dust generation such as cutting and grinding.

In Canada, the *Surface Coating Materials Regulations* (SOR/2005-109) under the federal *Hazardous Products Act* provides a concentration of lead (90 mg/kg) that must not be exceeded in surface coatings that are presently sold in this country. This regulation is not applicable to paint already on material surfaces.

The assessment methods for lead in paint (paint chip testing and visual observation) can only document the presence of heavy metals. The facility owner and contractors can use this information for determining appropriate work practices. In NS, the key values for determining work place exposure to lead-based paints are provided under the *Occupational Health and Safety Act* and the *Workplace Health and Safety Regulations. They* reference the most recent ACGIH TLVs-TWA which for worker exposure to airborne lead is 0.05 mg/m^3.

Furthermore, in the absence of a Nova Scotia guideline, the Ontario Ministry of Labour (MOL) document entitled "Guideline: Lead on Construction Project" (April 2011), provides procedures for removing lead paint where work on lead containing materials are likely to produce airborne lead dust or fumes, for example during welding, torch cutting, sanding and sand blasting. If these operations are likely to occur during building renovations or demolition, it is recommended that lead paint removal be carried out in accordance with procedures in the Ontario guideline.

Nova Scotia has established guidelines, "Disposal of Contaminated Solids in Landfills", which restrict certain materials from municipal landfills and C&D waste disposal sites which could potentially leach/migrate into the ground and create an adverse environmental effect. Lead is an inorganic contaminant that has been associated with (among others) paints and other protective coatings. Lead can leach from its base material into soil and groundwater creating environmental impacts. The Nova Scotia disposal guidelines establish an allowable lead concentration of 1,000 mg/kg, and an allowable lead leachate concentration of 5 mg/L, in determining whether or not disposal can occur in the province. The material may consist of paint and substrate if the paint is in good condition, or paint chips only, if the paint is peeling or in poor condition.

Materials with a total lead concentration exceeding 1,000 mg/kg but under the leachate regulatory limit of 5 mg/L, can be sent to either a solid waste landfill or C&D waste disposal site pending final authorization from the facility operator. If the material has a lead leachate concentration above 5 mg/L, it is considered "lead leachate toxic" and must be disposed of at an approved facility. There are currently no facilities in Nova Scotia capable of accepting "lead leachate toxic" materials and out-of-province disposal is required.

MERCURY-CONTAINING EQUIPMENT

Mercury can be found in reservoirs in thermostats, in fluorescent and high intensity discharge (HID) light tubes for mercury vapour and in high pressure sodium and metal halide lights. The Canadian Council of Ministers of the Environment (CCME) has developed Canada-Wide Standards for mercury lights and mercury emissions. The goal of the standards is to reduce the release of mercury into the environment.

The key values for determining work place exposure to mercury in air is provided under the *Occupational Health and Safety Act* and the *Workplace Health and Safety Regulations*, which in Nova Scotia reference the most recent ACGIH TLVs-TWA. The ACGIH TLVs-TWA for worker exposure to airborne mercury is 0.025 mg/m^3.

POLYCHLORINATED BIPHENYLS (PCBS)

From the 1930s to the 1970s, PCBs were widely used in a number of industrial materials, including sealing and caulking compounds, inks and paint additives. They were also used to make coolants and lubricants for certain kinds of electrical equipment, including transformers and capacitors. PCBs are an environmental concern as they do not readily degrade and have been identified to bioaccumulate. In Canada, the federal *Environmental Contaminants Act* (1976) prohibited the use of PCBs in heat transfer and electrical equipment installed after September 1, 1977, and in transformers and capacitors installed after July 1, 1980. In addition, the storage and disposal of PCB waste materials is regulated.

As of September 5, 2008, under Subsection 93(1) of the *Canadian Environmental Protection Act*, (CEPA), Federal PCB regulations have been published by the Canada Gazette Part II (SOR/2008-273) that impose specific deadlines for the elimination of all PCBs in concentrations at or above 50 mg/kg. The regulation requires the elimination of all PCBs and PCB-containing materials currently in-use and in storage and limits the period of time PCB materials can be stored before being eliminated. Other aspects of the regulation govern the labeling and reporting of stored PCB materials and equipment as well as improved practices for the management of PCBs that remain in use (*i.e.*, those with PCB concentrations less than 50 mg/kg) until their eventual elimination.

The Environment Canada document "Identification of Lamp Ballasts Containing PCBs" Report EPS 2/CC/2 (revised) August, 1991, can be used to identify PCB capacitors in fluorescent light ballasts and high intensity discharged (HID) light fixtures.

HAZARDOUS MATERIALS REGULATIONS, GUIDELINE AND OTHER REFERENCE DOCUMENTS

Table A1 provides a summary of applicable regulations, guidelines and other reference documents.

Table A1 Summary of Applicable Regulations, Guidelines and Other Reference Documents

Material	Reference Documentation
Asbestos	**Provincial:** • Occupational Health and Safety Act, S.N.S. 1996, c. 7, Province of Nova Scotia, last updated in 2013, c.41; • Occupational Health Regulations, N.S. Reg. 112/76, , Province of Nova Scotia; • Asbestos Waste Management Regulations, N.S. Reg. 53/95, Province of Nova Scotia, last updated on October 18, 2013; • Guidelines for Maintenance Operations Involving Asbestos, Nova Scotia Department of Environment and Labour, Occupational Health & Safety Division, March 26, 1998; • Guidelines for Outdoor Work with Asbestos, Nova Scotia Department of Environment and Labour, Occupational Health & Safety Division, March 26, 1998; • A Guide to Assessment and Management of Asbestos in the Workplace, Province of Nova Scotia, November 21, 2013; • A Guide to Removal of Friable Asbestos Containing Material, Province of Nova Scotia, November 21, 2013; and • Dealing with Asbestos Containing Materials-An Information Package, Province of Nova Scotia, July 1988. **Federal:** • Department of National Defence Canadian Forces Asbestos Management Directive (DND CF Asbestos Management Directive), DND, March 2007; • Department of National Defence Vermiculite Survey Guidance Document (DND Vermiculite Survey Guidance Document), DND, June 2004; • Hazardous Products Act, R.S.C., 1985, c. H-3, Government of Canada, current to May 11, 2015; • Asbestos Products Regulations, SOR/2007-260, Government of Canada, current to May 11, 2015; • Canada Labour Code, R.S.C., 1985, c.L-2, Government of Canada, current to May 11, 2015; • Canada Occupational Health and Safety Regulations, SOR/86-304, Government of Canada, current to May 11, 2015; and • Transportation of Dangerous Goods Act, 1992. **Other:** • TLVs® and BEI® Based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices, American Conference of Governmental Industrial Hygienists (AICGH), Signature Publications, 2016.
Lead-based Paint	• Hazardous Products Act, R.S.C., 1985, c. H-3, SOR/2010-297; • Code of Practice: Working With Inorganic Lead, NS Labour and Workforce Development, 2010; • Guidelines for Disposal of Contaminated Solids in Landfills, March 22, 1994, Amended May 18, 2005; • Surface Coating Materials Regulations, SOR/2005-109; • U.S. HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, Second Edition, July, 2012; • Proposed Risk Management Strategy for Lead, Health Canada, July 2011; • Ontario Ministry of Labour Guideline - Lead on Construction Projects, 2004; and • Transportation of Dangerous Goods Act, 1992.
Mercury-containing equipment	• Hazardous Products Act, R.S.C., 1985, c. H-3, SOR/2010-297; • Canada Wide Standard for Mercury Containing Lamps (CCME, May 2001); and • Canada Wide Standard for Mercury Emissions (CCME, June 2000).

Table A1 Summary of Applicable Regulations, Guidelines and Other Reference Documents

Material	Reference Documentation
PCB-containing equipment	• PCB Management Regulations, N.S. Reg. 95-291; • Dangerous Goods Management Regulations, N.S. Reg. 23/2002; • Transportation of Dangerous Goods Act, 1992; • Transportation of Dangerous Goods Regulations, SOR/2012-245; • PCB Waste Export Regulations, SOR/97-109; • Federal Mobile PCB Treatment and Destruction Regulations, SOR/90-5; • PCB Regulations, SOR/2008-273; • Identification of Lamp Ballasts Containing PCBs, Environment Canada Report EPA 2/CC/2, revised August 1991; • Guidelines for Management of Wastes Containing PCBs, Environment Canada; and • Handbook on PCBs in Electrical Equipment, 3rd Edn., Environment Canada, April 1988.

Attachment B
Photo Log

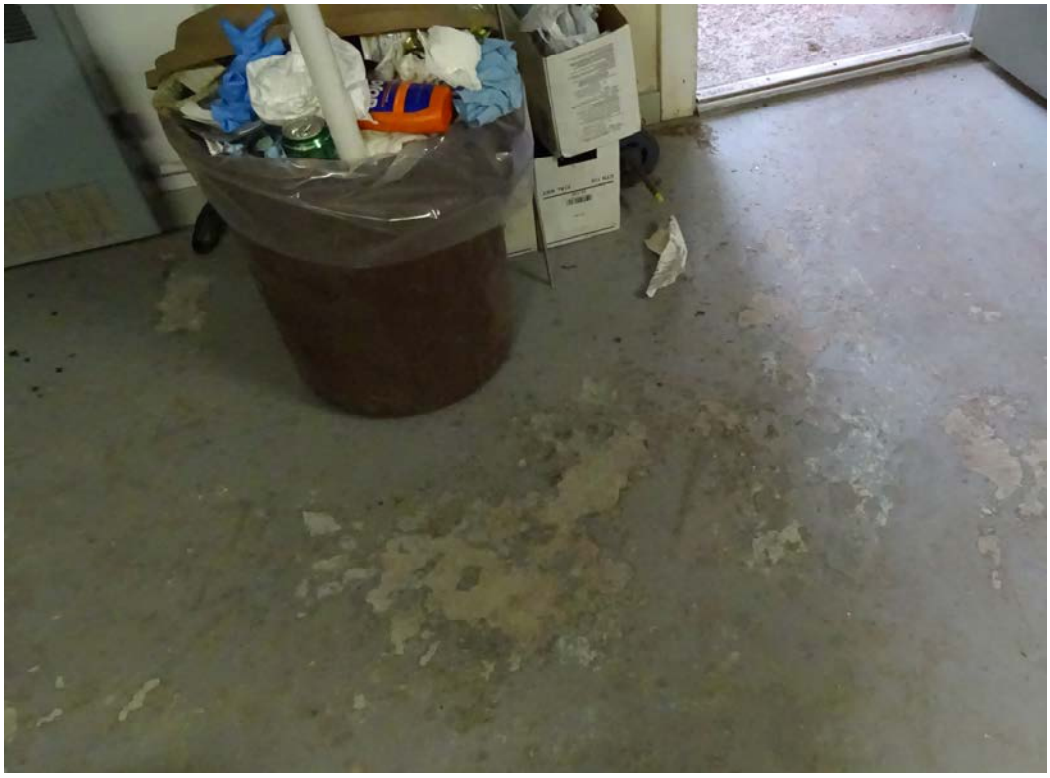


PHOTO 1: Showing gray paint over pale green paint on base level mechanical room floor (PS-CSIL-01).

PHOTO 2: Showing red paint on metal ladders and railings (PS-CSIL-02).

PHOTO 3: Showing red paint on concrete floors on all levels (PS-CSIL-03).

PHOTO 4: Showing gray paint on wood window trim in the 2nd level operations room (PS-CSIL-04).

PHOTO 5: Showing white paint on drywall in 2nd level operations room (PS-CSIL-05). Also showing light fixtures housing suspected PCB-containing lamp ballasts.

PHOTO 6: Showing white paint on wood floor and trim in the interior lantern gallery (PS-CSIL-06).

PHOTO 7: Showing the white paint on the exterior concrete of the lighthouse (PS-CSIL-07).

PHOTO 8: Showing the asbestos-containing drywall joint compound in poor condition in the 2nd level operations room (BS-CSIL-03A).

PHOTO 9: Showing suspected PCB-containing fluorescent lamp ballast in the lighthouse.

Attachment C
Laboratory Certificate of Analysis - Asbestos

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

EMSL Canada Order 551601630
Customer ID: 55JACQ30EE
Customer PO: 121414118
Project ID:

Attn: Don Hartt
Stantec Consulting Ltd.
102-40 Highfield Park Drive
Suite 102
Dartmouth, NS B3A 0A3

Proj: 121414118

Phone: (902) 468-7777
Fax: (902) 468-9009
Collected:
Received: 2/17/2016
Analyzed: 2/18/2016

Test Report: Asbestos Analysis of Bulk Materials for Nova Scotia Code of Practice Section 66 OHS Act - Asbestos in the Workplace via EPA600/R-93/116 Method

Client Sample ID: BS-CSIL-01A **Lab Sample ID:** 551601630-0001
Sample Description: DRYWALL JOINT COMPOUND

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	2/17/2016	Tan	0%	98%	2% Chrysotile	

Client Sample ID: BS-CSIL-01B **Lab Sample ID:** 551601630-0002
Sample Description: DRYWALL JOINT COMPOUND

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	2/17/2016			Stop Positive (Not Analyzed)		

Client Sample ID: BS-CSIL-01C **Lab Sample ID:** 551601630-0003
Sample Description: DRYWALL JOINT COMPOUND

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	2/17/2016			Stop Positive (Not Analyzed)		

Client Sample ID: BS-CSIL-02A **Lab Sample ID:** 551601630-0004
Sample Description: ASPHALT SHINGLE

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/17/2016	Various/Black	0.0%	100%	None Detected	

Client Sample ID: BS-CSIL-02B **Lab Sample ID:** 551601630-0005
Sample Description: ASPHALT SHINGLE

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/17/2016	Black	0.0%	100%	None Detected	

Client Sample ID: BS-CSIL-02C **Lab Sample ID:** 551601630-0006
Sample Description: ASPHALT SHINGLE

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/18/2016	Various/Black	0.0%	100%	None Detected	

Client Sample ID: BS-CSIL-03A **Lab Sample ID:** 551601630-0007
Sample Description: DRYWALL JOINT COMPOUND

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	2/17/2016	Tan	0%	98%	2% Chrysotile	

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

EMSL Canada Order 551601630
Customer ID: 55JACQ30EE
Customer PO: 121414118
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Nova Scotia Code of Practice Section 66 OHS Act - Asbestos in the Workplace via EPA600/R-93/116 Method

Client Sample ID: BS-CSIL-03B ***Lab Sample ID:*** **551601630-0008**

Sample Description: DRYWALL JOINT COMPOUND

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	2/17/2016				Stop Positive (Not Analyzed)	

Client Sample ID: BS-CSIL-03C ***Lab Sample ID:*** **551601630-0009**

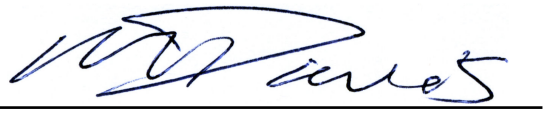
Sample Description: DRYWALL JOINT COMPOUND

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	2/17/2016				Stop Positive (Not Analyzed)	

Analyst(s):

Natalie D'Amico	PLM Grav. Reduction (1)
Romeo Samson	PLM (2) PLM Grav. Reduction (2)

Reviewed and approved by:



Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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: 02/18/201608:58:57

Attachment D
Laboratory Certificate of Analysis - Lead Paint

Maxxam
A Bureau Veritas Group Company

Your Project #: 121414118.200
Site Location: LIGHTHOUSES
Your C.O.C. #: N/A

Attention:Don Hartt

Stantec Consulting Ltd
40 Highfield Park Drive
Suite 102
Dartmouth, NS
B3A 0A3

Report Date: 2016/02/23
Report #: R3905098
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B631458
Received: 2016/02/16, 15:22

Sample Matrix: Paint
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Leach TCLP/CGSB extraction	5	2016/02/18	2016/02/19	ATL SOP 00058	EPA 6020A R1 m
Metals Leach TCLP/CGSB extraction	2	2016/02/19	2016/02/20	ATL SOP 00058	EPA 6020A R1 m
Metals Paint Acid Extr. ICPMS	7	2016/02/18	2016/02/19	ATL SOP 00058	EPA 6020A R1 m
TCLP Inorganic extraction - pH	5	N/A	2016/02/18	ATL SOP 00035	EPA 1311 m
TCLP Inorganic extraction - pH	2	N/A	2016/02/19	ATL SOP 00035	EPA 1311 m
TCLP Inorganic extraction - Weight	6	N/A	2016/02/18	ATL SOP 00035	EPA 1311 m
TCLP Inorganic extraction - Weight	1	N/A	2016/02/19	ATL SOP 00035	EPA 1311 m

Sample Matrix: SOLID
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Leach TCLP/CGSB extraction	2	2016/02/19	2016/02/20	ATL SOP 00058	EPA 6020A R1 m
TCLP Inorganic extraction - pH	2	N/A	2016/02/19	ATL SOP 00035	EPA 1311 m
TCLP Inorganic extraction - Weight	2	N/A	2016/02/19	ATL SOP 00035	EPA 1311 m

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Marie Muise, Project Manager
Email: MMuise@maxxam.ca
Phone# (902)420-0203 Ext:253

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B631458
Report Date: 2016/02/23

Stantec Consulting Ltd
Client Project #: 121414118.200
Site Location: LIGHTHOUSES
Sampler Initials: DH

ATLANTIC TCLP LEACHATE + LEAD (PAINT)

Maxxam ID		BWB951		BWB952			BWB953		
Sampling Date		2016/02/16		2016/02/16			2016/02/16		
	UNITS	**PS-CSIL-01 (PAINT)**	**QC Batch**	**PS-CSIL-02 (PAINT)**	**RDL**	**QC Batch**	**PS-CSIL-03 (PAINT)**	**RDL**	**QC Batch**
Inorganics									
Sample Weight (as received)	g	28	4385617	34	N/A	4385898	59	N/A	4385617
Initial pH	N/A	5.0	4385621	5.1	N/A	4385937	5.1	N/A	4385621
Final pH	N/A	6.2	4385621	5.7	N/A	4385937	5.7	N/A	4385621
Metals									
Leachable Lead (Pb)	ug/L	430	4385799	36000	5.0	4387297	110000	50	4385799

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		BWB954	BWB956	BWB958		BWB959		
Sampling Date		2016/02/16	2016/02/16	2016/02/16		2016/02/16		
	UNITS	**PS-CSIL-04 (PAINT)**	**PS-CSIL-05 (PAINT)**	**PS-CSIL-06 (PAINT)**	**QC Batch**	**PS-CSIL-07 (PAINT)**	**RDL**	**QC Batch**
Inorganics								
Sample Weight (as received)	g	7.8	5.9	2.8	4385617	26	N/A	4385898
Initial pH	N/A	5.6	5.7	5.0	4385621	5.1	N/A	4385937
Final pH	N/A	6.6	6.4	5.5	4385621	6.6	N/A	4385937
Metals								
Leachable Lead (Pb)	ug/L	93	8.5	59000	4385799	19	5.0	4387297

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B631458
Report Date: 2016/02/23

Stantec Consulting Ltd
Client Project #: 121414118.200
Site Location: LIGHTHOUSES
Sampler Initials: DH

ATLANTIC TCLP LEACHATE + LEAD (SOLID)

Maxxam ID		BWB955	BWB957		
Sampling Date		2016/02/16	2016/02/16		
	UNITS	**PS-CSIL-04 (PAINT + SUBSTRATE)**	**PS-CSIL-05 (PAINT + SUBSTRATE)**	**RDL**	**QC Batch**
Inorganics					
Sample Weight (as received)	g	5.9	11	N/A	4385898
Initial pH	N/A	4.8	4.9	N/A	4385937
Final pH	N/A	4.8	5.1	N/A	4385937
Metals					
Leachable Lead (Pb)	ug/L	23	83	5.0	4387297

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B631458
Report Date: 2016/02/23

Stantec Consulting Ltd
Client Project #: 121414118.200
Site Location: LIGHTHOUSES
Sampler Initials: DH

ELEMENTS BY ATOMIC SPECTROSCOPY (PAINT)

Maxxam ID		BWB951	BWB952	BWB953	BWB954		
Sampling Date		2016/02/16	2016/02/16	2016/02/16	2016/02/16		
	UNITS	**PS-CSIL-01 (PAINT)**	**PS-CSIL-02 (PAINT)**	**PS-CSIL-03 (PAINT)**	**PS-CSIL-04 (PAINT)**	**RDL**	**QC Batch**
Metals							
Acid Extractable Lead (Pb)	mg/kg	1200	42000	28000	740	5.0	4385717

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		BWB956	BWB958	BWB959		
Sampling Date		2016/02/16	2016/02/16	2016/02/16		
	UNITS	**PS-CSIL-05 (PAINT)**	**PS-CSIL-06 (PAINT)**	**PS-CSIL-07 (PAINT)**	**RDL**	**QC Batch**
Metals						
Acid Extractable Lead (Pb)	mg/kg	17	55000	67	5.0	4385717

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B631458
Report Date: 2016/02/23

Stantec Consulting Ltd
Client Project #: 121414118.200
Site Location: LIGHTHOUSES
Sampler Initials: DH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	20.3°C

Revised Report: Re-issue report to only include lead and lead leachate results due to lab error. 2016/02/23 MMC

Sample BWB951-01 : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Sample BWB952-01 : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Sample BWB953-01 : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Sample BWB954-01 : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Sample BWB955-01 : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Sample BWB956-01 : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Sample BWB957-01 : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Sample BWB958-01 : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Sample BWB959-01 : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B631458
Report Date: 2016/02/23

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121414118.200
Site Location: LIGHTHOUSES
Sampler Initials: DH

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4385617	Sample Weight (as received)	2016/02/18					NA	g		
4385717	Acid Extractable Lead (Pb)	2016/02/19	NC	75 - 125	98	75 - 125	<5.0	mg/kg	2.4	35
4385799	Leachable Lead (Pb)	2016/02/19	99	75 - 125	97	80 - 120	<5.0	ug/L		
4385898	Sample Weight (as received)	2016/02/19					NA	g	0.025	N/A
4387297	Leachable Lead (Pb)	2016/02/20	95	75 - 125	96	80 - 120	<5.0	ug/L		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

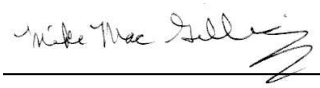
Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B631458
Report Date: 2016/02/23

Stantec Consulting Ltd
Client Project #: 121414118.200
Site Location: LIGHTHOUSES
Sampler Initials: DH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Mike MacGillivray, Scientific Specialist (Inorganics)

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com