DESIGNATED SUBSTANCES SURVEY

Duplex Residence Structure
66 & 68 Alder Drive
Inuvik, Northwest Territories

Submitted to:

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22 February 2016

Amec Foster Wheeler Project No. TV147020

EXECUTIVE SUMMARY

Public Works and Government Services Canada (PWGSC) retained Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler) conducted a designated substances survey (DSS) of the residential duplex building located at 66 & 68 Alder Drive, in Inuvik, Northwest Territories (the 'Site'). The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and the warehouse.

The purpose of the survey was to assess the building for the presence of specific hazardous substances; namely potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing equipment, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs) in light ballasts, silica, suspect visible mould growth (SVG) and toxic characteristic leaching procedure (TCLP) testing for lead.

At the time of the Site inspection, the property was developed as a two storey, duplex residential building with an above ground crawlspace constructed on wood pilings. The building was vacant at the time of the Site visit. The building was reported by PWGSC to have been constructed in 1974.

Based on Amec Foster Wheeler's field assessment and laboratory results, identified ACMs included gypsum board joint compound associated with the walls and ceilings, stipple observed on ceilings, and vinyl roll flooring of various styles observed under surface layers of flooring observed throughout the structure. Amec Foster Wheeler recommends that identified ACMs be removed using Moderate and High asbestos abatement procedures.

Amec Foster Wheeler was unable to observe the attic as there was no access hatch and could not access the roof due to height. A core hole using a power drill was made into the attic space to determine the presence of vermiculite. Rigid foam insulation materials were observed in the attic space and a sample of building paper was recovered for bulk asbestos analysis. Further assessment would be required to confirm these materials.

Amec Foster Wheeler identified one LCP surface coatings which may be affected by building renovation or demolition activities. The LCP was confirmed in the paint associated with the door trim from a second floor bedroom in 68 Alder Drive. One of the fourteen paint samples collected were above the total lead content for disposal at a regular landfill. Nine of the paint samples were submitted for TCLP analysis and were determined to be below the applicable regulatory value for lead concentration.

Ballasts in the light fixtures in the kitchen and furnace room of both sides of the duplex were observed to be non-PCB containing. Amec Foster Wheeler considers it good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed.

Amec Foster Wheeler observed a mercury containing thermostat in the living room of 68 Alder Drive. Fluorescent lamp tubes associated with the observed light fixtures are suspected of containing mercury. Prior to demolition activities, all mercury-containing equipment must be removed and disposed of in accordance with regulatory requirements. It is considered good practice to recycle the lamps and recover the mercury where possible.

There was no equipment or others materials suspected of containing ODSs other than two domestic refrigerators. All equipment suspected of containing ODSs should be inspected by a qualified technician prior to removal or disposal and if found to contain ODS, the unit must be decommissioned in accordance with federal and territorial regulations.

SVG was not observed on Site. SVG may be present within enclosed spaces and may have not been evident during the Site visit.

Further discussion of the identified designated substances and recommendations are provided in the body of this report.

TABLE OF CONTENTS

EXECUTIVE SUMMARY ..... **I**

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE **1**

1.1 SCOPE OF WORK 1

2.0 DESCRIPTION OF SITE **2**

3.0 SURVEY RESULTS **2**

3.1 ASBESTOS-CONTAINING MATERIALS 3
3.2 LEAD AND LEAD-CONTAINING PAINT 4
3.3 MERCURY CONTAINING DEVICES 4
3.4 OZONE DEPLETING SUBSTANCES 5
3.5 POLYCHLORINATED BIPHENYLS 5
3.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE 5

4.0 RECOMMENDATIONS **5**

4.1 ASBESTOS-CONTAINING MATERIALS 5
4.2 LEAD AND LEAD CONTAINING PAINT 6
4.3 MERCURY CONTAINING DEVICES 6
4.4 OZONE DEPLETING SUBSTANCE 7
4.5 POLYCHLORINATED BIPHENYLS 7
4.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE 7
4.7 OTHER RECOMMENDATIONS 7
4.8 GENERAL WORKER PROTECTION 7

5.0 SURVEY LIMITATIONS **8**

6.0 CLOSURE **9**

LIST OF APPENDICES

Appendix A Survey Definitions and Methodology
Appendix B Sampling Summary Tables
Appendix C Site Photographs
Appendix D Laboratory Certificates of Analyses

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler), was retained by Public Works and Government Services Canada (PWGSC) to conduct designated substances survey of the existing duplex residential building located at 66 & 68 Alder Drive, in Inuvik, NT (the 'Site'). The Site was vacant and two storey with an above ground crawlspace constructed on wood pilings.

Amec Foster Wheeler understands that the purpose of the survey was to assess the structure for the presence of specific designated substances (DS) that may require special handling prior to renovation or demolition activities. Specific DS to be surveyed for included potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing devices, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs), and suspect visible mould growth (SVG). Based on the PWGSC Terms of Reference (TOR) the building is not currently scheduled for demolition but a structural evaluation is being conducted to determine the fate of the building. The structural evaluation prepared by Amec Foster Wheeler is provided under separate cover.

The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and warehouse.

1.1 SCOPE OF WORK

As stipulated in Amec Foster Wheeler's proposal dated 21 December 2015, the proposed scope of work was to include the following activities. The scope of work encompassed the completion of the following tasks for eight residential and two industrial buildings, each located in Inuvik, Northwest Territories.

- Conduct a DS survey of existing structure, including field and laboratory testing to confirm the presence/absence of materials of concern;
- Where reasonable within the context of the project budget and scope, provide quantities of DS associated with the building structure; and
- Prepare a DSS report for each individual structure.

Amec Foster Wheeler completed the above tasks for accessible areas within the subject building. Areas which were not accessible included the roof and the attic given the height of the roof and that there was no access hatch for the attic. A detailed summary of Amec Foster Wheeler's sampling methodology and definitions associated with the designated substances of concern are provided in Appendix A.

Amec Foster Wheeler completed the field assessment portion of the above scope of work on 18 January 2016. PWGSC did not provide Amec Foster Wheeler with any reports on the building for review.

2.0 DESCRIPTION OF SITE

At the time of the Site inspection, the property was developed as a two storey residential duplex building with an above ground crawlspace constructed on wood pilings. The crawlspace was enclosed and heated with access provided via an exterior access hatch. The building was reported by PWGSC to have been vacant for a period of three years and constructed in 1974.

The building finishes was generally in fair to good condition and appeared to have undergone some renovations since construction. The building was heated and had electrical services.

The general Site construction details were as follows:

Exterior Walls:	The exterior walls of the building were observed to be wood framing finished with vinyl clad siding.
Roof:	The roof was observed from the ground to be pitched, and finished with shingles. The roof was not accessed due to the height of the roof. An attic space is present however there was no access other than a small core hole completed by Amec Foster Wheeler to inspect for vermiculite.
Interior Walls:	Interior walls consisted of painted gypsum board.
Floor:	The flooring consisted of a combination of vinyl roll flooring (VRF, commonly referred to as linoleum), carpet and laminate. Multiple layers of flooring were noted in some locations. The building was underlain by a partially enclosed crawlspace. Crawlspace access was provided via an exterior access hatch.
Interior Ceilings:	The ceilings consisted of gypsum board finished with texture finish (stipple).
Lighting:	Lighting was provided by incandescent bulbs with the exception of one fluorescent light fixture in the furnace rooms and two cabinet mounted fixtures in each kitchens.
Mechanical:	Heating was provided by a natural gas fired furnace.

Site photographs taken at the time of the site visit are provided in Appendix C.

3.0 SURVEY RESULTS

Ms. Karen Fortin and Mr. Mark Miller of Amec Foster Wheeler coordinated site inspection activities with Mr. Wally Ballas of PWGSC (Inuvik) who provided access and Site information for each of the structures.

Amec Foster Wheeler conducted a visual assessment of all accessible areas of the building as outlined in Appendix A: Survey Definitions and Methodology. No attic access was possible during the site visit as no attic hatch was present and the roof was not accessed due to height.

Photographs showing the Site condition and sample locations are provided in Appendix C.

3.1 ASBESTOS-CONTAINING MATERIALS

During the survey of the Site, Amec Foster Wheeler collected samples of suspect ACMs which were submitted to Amec Foster Wheeler's in Atlanta, Georgia for confirmatory laboratory analysis. A total of 35 samples of 8 separate building materials were collected and submitted for analysis. The results of Amec digital photographs of representative sampled materials are included in Appendix B, and the laboratory certificates of analysis are included in Appendix D.

ACMs identified include the following. All materials were generally observed in fair to good condition.

a) **Gypsum board joint compound (friable)** - observed throughout the building was determined to contain between 2 - 3% Chrysotile asbestos fibres based on samples ACM-03 – 66 Alder, ACM-04 – 66 Alder, ACM-09 – 66 Alder, ACM-16 – 66 Alder, ACM-18 – 66 Alder, ACM-21 – 66 Alder, ACM-01 – 68 Alder, and ACM-08 – 68 Alder (Photos 2, 7, & 9).
b) **Vinyl roll flooring (friable backing)** – observed underneath surface layers of flooring were determined to contain between 20 - 25% Chrysotile asbestos fibres based on samples ACM-14 – 66 Alder, ACM-15 – 66 Alder, ACM-05 – 68 Alder, and ACM-09 – 68 Alder (Photos 3, 4, & 8).
c) **Texture finish (stipple; friable)** – observed on ceilings throughout the building was determined to contain between 2 - 3% Chrysotile asbestos fibres based on samples ACM-17 – 66 Alder, ACM-22 – 66 Alder, ACM-06 – 68 Alder, ACM-10 – 68 Alder, and ACM-11 – 68 Alder (Photos 5, 6, 10 & 11).

There were a number of other suspect ACMs present in the building that were sampled and, based on the laboratory analysis undertaken, are <u>not</u> considered to be ACMs including the following:

a) Surface layers of vinyl roll flooring (7 samples);
b) Select samples of texture ceiling finish (3 samples);
c) Pipe insulation wrap observed in the furnace room of 66 Alder Drive; and
d) Duct tape associated with the furnaces (2 samples)

Amec Foster Wheeler did not access the attic space as no access hatch was present. The roof was not observed as it was not accessible by a ladder.

ACMs may be present in forms that were not observed or sampled during the Site inspection including, but not limited to, caulking, fire rated doors, thermal insulating materials such as gaskets associated with mechanical equipment, wiring and electrical components, packing associated with cast iron pipe joints, or in areas that were not accessible at the time of the survey.

For the purpose of renovation, demolition, or any other alteration or disturbance, all suspect ACMs, unless confirmed through sampling and analysis, should be considered to contain asbestos and handled in accordance with a written work plan that references current Territorial guidelines as presented in the *Northwest Territories & Nunavut Code of Practice on Asbestos Abatement"* (2012).

3.2 LEAD AND LEAD-CONTAINING PAINT

Based on the date of original building construction (1974), there is a potential that LCP and other lead containing materials may have been used during construction of the original building or subsequent renovations. Amec Foster Wheeler submitted six samples of paint (samples PB01 - 66Alder to PB08 - 66Alder) from 66 Alder Drive and eight samples of paint (samples PB01 - 68Alder to PB08 - 68Alder) for laboratory analysis. At the discretion of the assessor, sampled items included representative walls, doors, trim and exterior decking. As explained in the report methodology, the sampling program considered typical paint coatings and not all surfaces were tested and mechanical equipment was not sampled. The samples were submitted to Amec Foster Wheeler's laboratory in Edmonton, Alberta for analysis of total lead content. The total lead concentration of the paint samples ranged from <10 mg/kg (parts per million) to 1020 mg/kg (ppm). The highest total lead concentration was determined to be 1020 mg/kg (ppm) from the white paint sample (PB08 – 68Alder) recovered from the door trim of the second floor Bedroom 1 in 68 Alder Drive.

As discussed in the Methodology Section, surface coatings with a lead content greater than 0.06% by weight (600 mg/kg) are considered to be LCPs for the purposes of this report. Laboratory results show that none of the eight samples collected are considered to be LCP.

Amec Foster Wheeler submitted nine of the above samples for further analysis using the toxicity characteristic leaching procedure (TCLP).

According to the *Guideline for Industrial Waste Discharges* in the Northwest Territories, the maximum allowable lead content in leachate from demolition debris is 5.0 milligrams per liter (mg/L). The TCLP samples collected by Amec Foster Wheeler ranged from 0.004 – 0.225 mg/L, which is below the maximum allowable lead content for solid waste.

Results of the laboratory analyses are summarized in Table 3 (Appendix B), digital photographs of the sample locations are included in Appendix C, and the Laboratory's Certificates of Analyses are included in Appendix D.

Based on the visual survey of the building, other products on-Site that may contain lead include copper plumbing fixture solders, plumbing fittings, cable coverings, and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials.

3.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler did observe a mercury-containing thermostat in the living room of 68 Alder Drive. The thermostat observed at 66 Alder Drive did not appear to contain mercury. Other potential mercury containing equipment include switches and thermostats associated with the building mechanical systems, however Amec Foster Wheeler did not observe any such equipment at the Site.

Fluorescent lamp tubes associated with the light fixtures observed in the kitchen and furnace rooms in the building are suspected of containing mercury. Based on current literature the fluorescent lamps observed in the building are suspected of containing between 4 and 12 mg of mercury (see Appendix A).

3.4 OZONE DEPLETING SUBSTANCES

Amec Foster Wheeler observed a refrigerator in both the kitchen at 66 & 68 Alder Drive, which are suspected to contain ozone depleting substances.

All equipment suspected of containing ODSs should be inspected by a qualified technician prior to removal or disposal and if found to contain ODS, the unit must be decommissioned in accordance with federal and territorial regulations.

3.5 POLYCHLORINATED BIPHENYLS

Amec Foster Wheeler inspected six ballasts located in two cabinet mounted light fixtures in the kitchens, and a ceiling fixture in the furnace rooms of both 66 & 68 Alder Drive. All ballasts observed were labelled as containing “No PCBs”.

3.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE

Amec Foster Wheeler did not observe any SVG or substantial water damage on Site. SVG may be present within enclosed spaces and may have not been evident during the Site visit.

4.0 RECOMMENDATIONS

The demolition recommendations for the materials identified in the building are provided below. It is assumed that all work will be completed on the vacant building in an area restricted to the public. All demolition activities shall be carried out in accordance with CSA standard S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures, the National Building Code Section 8 (Safety Measures at Construction and Demolition Sites) and other related sections.

All work shall be completed by qualified workers following written safe work procedures, in accordance with requirements of the *General Safety Regulation*, under the Northwest Territories *Safety Act*.

4.1 ASBESTOS-CONTAINING MATERIALS

Recommendations for the removal of ACMs identified in each of the proposed work areas are provided below. Completion of any of these recommendations must be performed by qualified asbestos workers or abatement contractors and in accordance with a written work plan prepared based on existing current Territorial regulations and/or guidelines.

a) **Gypsum board joint compound (friable, approximately 760 m^2) -** observed in various locations throughout the building. These materials may be removed following Moderate Risk asbestos abatement procedures.
b) **Vinyl roll flooring (friable backing, approximately 220 m^2) -** observed beneath the surface layers of flooring in the kitchens and furnace rooms and suspected to be present

throughout the building. These materials may be removed by following High Risk asbestos abatement procedures (> 9.3 m^2) or Moderate Risk procedures (<9.3 m^2).

c) **Texture finish (stipple; friable, approximately 230 m^2) -** observed on all ceilings throughout the building may be removed following High Risk asbestos abatement procedures along with the gypsum board and joint compound which is assumed to contain asbestos.

Additional evaluation of the roof and attic space should be considered in the event of renovation or demolition involving these areas. ACM vermiculite insulation may be present in the attic and ACMs may be present in the roofing materials.

4.2 LEAD AND LEAD CONTAINING PAINT

Amec Foster Wheeler identified one LCP surface coating which may be affected by building renovation or demolition activities. LCP was confirmed in painted surface associated with the door trim of bedroom one in 68 Alder Drive. This material is not suitable for disposal at a landfill in the Northwest Territories and a suitable disposal location will need to be identified.

TCLP analysis results for the six samples collected by Amec Foster Wheeler were below the maximum allowable lead leachate concentration for demolition debris.

The remaining demolition debris is expected to be disposed of at most construction landfills without restrictions, however this should be confirmed with the landfill receiving the demolition waste prior to demolishing the building so that any requirements for special handling or disposal can be determined and suitable arrangement made.

Based on the visual survey of the building, other products on-Site that may contain lead include copper plumbing fixture solders, plumbing fittings, cable coverings, and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials.

All workers who may be exposed to lead must undergo hazard specific awareness training. All workers who may be performing activities that may create airborne lead dust, such as grinding, cutting, sandblasting or welding, should wear personal protective equipment including appropriate respiratory equipment, dermal protection and disposable coveralls. As lead containing paint poses a greater concern when heated, such as during welding operations, it is considered good practice to remove lead containing paint from surfaces to be welded or otherwise heated. Workers should also follow appropriate decontamination procedures prior to leaving the work area.

4.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler observed a mercury-containing thermostat within the living room of 68 Alder Drive. Fluorescent lamps were observed in the kitchen and furnace rooms of both 66 & 68 Alder Drive (approximately 10 tubes). The presence of mercury in fluorescent lamps and thermostats poses minimal risks to occupants or workers provided the equipment is handled properly and the mercury is not allowed to escape. Prior to demolition activities all mercury-

containing equipment must be removed. Where possible, the fluorescent lamps should be recycled and the mercury collected from thermostats.

4.4 OZONE DEPLETING SUBSTANCE

Residential refrigerators were observed in the kitchens of each side of the building are suspect of containing ozone depleting substances, no other equipment suspected of containing ODSs were observed on Site. Any suspect equipment discovered during demolition/renovation, should be inspected for the presence of ODSs and handled or disposed of in accordance with current Federal and Territorial regulations which shall be completed by trained and qualified technicians.

4.5 POLYCHLORINATED BIPHENYLS

No PCB containing ballasts were observed on Site. It is considered good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed. If 'non-PCB' or 'No PCBs' labelling is not found on the ballasts, the ballasts should be compared to information obtained from the manufacture to determine PCB content. If the PCB content of the ballast cannot be determined, the ballast should be assumed to contain PCBs unless laboratory testing indicates otherwise. All PCB-containing ballasts, known or assumed, must be stored and transported in accordance with applicable Territorial and Federal hazardous waste and transportation of dangerous goods legislation

4.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE

Amec Foster Wheeler did not observe SVG or water damage on Site. SVG may be present within enclosed spaces and may have not been evident during the Site visit.

In addition, as with all workers who may be exposed to hazardous materials, all demolition workers must undergo hazard specific awareness training. It is further recommended that all workers wear personal protective equipment such as appropriate respiratory equipment, dermal protection and disposable coveralls. All workers should also follow appropriate decontamination procedures prior to leaving the work area.

4.7 OTHER RECOMMENDATIONS

In the event of a demolition, it is recommended that all work be conducted in accordance with a Site specific demolition plan which should address such items as abatement, demolition methods, worker training and protection, decontamination procedures, dust suppression, and transportation and disposal of waste. It is expected that the demolition contractor will prepare such documents based on direction provided in project specification documents which are to be developed at a later date.

4.8 GENERAL WORKER PROTECTION

While all identified designated substances were in fair to good condition or otherwise had limited access (attic space), Amec Foster Wheeler recommends that any areas where designated substances are present which may pose a worker exposure issue, be isolated and the area restricted to knowledgeable workers with appropriate personal protection equipment. Given that

the Site is vacant and minimum maintenance is expected, the Site conditions are subject to change.

5.0 SURVEY LIMITATIONS

Within the limitations of the agreed-upon scope of work, the field observations, measurements and analysis are considered sufficient to provide an overview of existing potential concerns or form a general inventory of hazardous materials in the subject area of the building. It should be noted that the data presented herein were collected at specific sampling locations, and depending on the homogeneity of the samples, the data may vary between these locations. Some inherent limitations exist as to the thoroughness of this assessment due to the nature of building construction. For example it may not practical to test all pipe insulation for asbestos content at the Site due to the amount and locations and being located under existing materials. Some reasonable extrapolation (e.g., sampling of similar materials) was required from the findings of the assessment.

Reasonable efforts were made to identify all substances designated in this report; however, Amec Foster Wheeler may not have been able to identify and assess all suspect designated substances, as certain building materials may exist that were not visible or accessible at the time of the survey. Inaccessible locations include those that require demolition to gain entry, which present an unacceptable health or safety risk to the surveyors, and where entry is prohibited by security or other institutional restrictions. Areas above a suspended tile ceiling, crawlspaces, pipe chases and service tunnels, and areas behind an access hatch were considered accessible. Materials hidden by walls, finishes and equipment at the time of the survey were considered inaccessible.

The field observations, measurements and analysis are considered sufficient to form a general inventory of hazardous materials in the surveyed areas. It is possible that materials may exist which could not be reasonably identified within the scope of the assessment or which were not apparent or accessible during the Site visit. Within the limitations of the agreed-upon scope of work, the survey included building materials found within or forming part of the building envelope and building mechanical systems and equipment. The inspection did not include the identification of suspected hazardous materials located in the interior of electrical, mechanical (i.e. interior surfaces of ventilation ducting, boilers, etc.), or process manufacturing equipment, inside wall cavities (e.g., pipe chases), inaccessible ceiling plenums, sub floors, underlying materials (e.g., underlying flooring and paint layers), and where sampling could have affected the integrity of the system (e.g., water-proof roof membrane and caulking). Amec Foster Wheeler is not responsible for the repairs of building materials that were sampled during the survey.

This assessment has been undertaken and performed in a professional manner in accordance with generally accepted practices, using the degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. The findings of this report are based solely on the conditions of the Site encountered at the time of the Site visit on 18 January 2016, and are limited by the availability of information at the time of the survey. Due to physical limitations inherent to this work, Amec Foster Wheeler expressly does not warrant that the Site is

free of designated substances or that all designated substances have been identified. It is possible that materials exist which could not be reasonably identified within the scope of the survey or which were not apparent or accessible during the site visit. No other warranties, expressed or implied, are made.

6.0 CLOSURE

This report was prepared for the exclusive use of Public Works and Government Services Canada and is intended to provide an overview of existing potential concerns within the specified work area at the time of the Site visit. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Amec Foster Wheeler is required. With respect to third parties, Amec Foster Wheeler has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

Amec Foster Wheeler has prepared this report for the express use of Public Works and Government Services Canada and may be relied upon by Public Works and Government Services Canada. No other person or organization is entitled to rely upon any part of this report without the prior written consent of Amec Foster Wheeler. Public Works and Government Services Canada may release all or part(s) of this report to third parties; however, such third party in using this report agrees that it shall have no legal recourse against Amec Foster Wheeler or its subsidiaries, and shall indemnify and defend Amec Foster Wheeler or its subsidiaries from and against all claims arising out of or in conjunction with such use or reliance.

This report does not constitute legal advice. Amec Foster Wheeler makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel. In addition, Amec Foster Wheeler makes no determination or recommendation regarding the decision to purchase, sell or provide financing for this property.

This report presents an overview of issues of concern with the specified substances, reflecting Amec Foster Wheeler's best judgment using information reasonably available at the time of Amec Foster Wheeler's evaluation / survey. In preparing this report, Amec Foster Wheeler has relied upon certain information and representations provided by others. Amec Foster Wheeler did not attempt to independently verify the accuracy or completeness of that information. To the extent that the conclusions in this report are based in whole or in part on such information, those conclusions are contingent on its accuracy and validity. Amec Foster Wheeler assumes no responsibility for any consequence arising from any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to Amec Foster Wheeler.

This Report is subject to the contractual project agreement.

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

Respectfully,
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APPENDIX A
SURVEY DEFINITIONS AND METHODOLOGY

SURVEY DEFINITIONS, METHODOLOGY AND REGULATORY REQUIREMENTS

1.0 FIELD METHODOLOGY

The survey generally consisted of a room-by-room survey of all accessible areas within the buildings surveyed. The surveyor identified potential designated substances by appearance, age, and knowledge of current and historical uses of the Site and subject materials. Accessible locations are those for which entry is not prohibited by security or other institutional restrictions, that could be inspected without the need for destructive testing (e.g. penetration of a surface such as a wall, ceiling chase or shaft to gain access), and which did present an unacceptable health or safety risk to the surveyor. The area above a suspended tile ceiling, crawlspaces, pipe chases / service tunnels or behind an access hatch was generally considered to not be accessible. Materials hidden by walls, finishes and equipment at the time of the survey are considered inaccessible. Reasonable effort was used to identify potential designated substances in areas not readily accessible, such as confined areas enclosed by gypsum board, plaster, or panelling, etc., or where minor demolition was required to gain entry.

Intrusive sampling may have been conducted in the form of collecting samples of pipe insulation and other building materials, removing baseboards, lifting areas of carpet or flooring and cutting or breaking small holes in wallboard or plaster. Amec Foster Wheeler only performed such activities in areas where operation of the facility and the health and safety of occupants was affected. Effort was made to minimize or conceal damage. Amec Foster Wheeler was not responsible for the repair of any other areas sampled as part of this evaluation with the exception of temporary repairs to leave area in safe workplace condition.

While in the field, the surveyor completed a detailed checklist or collected detailed field notes for the building; a description of the rooms and a detailed description of any suspected designated substances observed within the rooms. Details of condition, visibility / accessibility, and any action that may be required to reduce asbestos fibre or other designated substances exposure hazards based on these observations were also recorded.

2.0 ASBESTOS-CONTAINING MATERIALS

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

The WSCC Asbestos Abatement Code of Practice states: “If asbestos-containing materials are identified and there is the potential for exposure, corrective action is required.” The Code of Practice also recommends considering the location, condition, function and cost prior to following the four basic approaches to controlling exposure: removal, encapsulation, enclosure and a management plan. The Code of Practice includes information on the techniques for the identification, safe abatement of asbestos-containing materials, and information on asbestos products, health hazards, worker protection, safe work procedures, inspection criteria,

applicable legislation and competency for those involved in abatement activities. This Code was adopted from the Alberta Asbestos Abatement Manual (2011).

In Northwest Territories, the *Occupational Health and Safety Regulations, Part 24* defines "asbestos" as a manufactured article or other material which contains 1% or more asbestos by weight either at the time of manufacture, or as determined by the following method:

- NIOSH Method 9002, as amended from time to time, from the NIOSH Manual of Analytical Methods, 4th Edition, published by the National Institute for Occupational Safety and Health, United States.

Friable material refers to an ACM that can be readily crumbled using hand pressure, separating asbestos fibres from the binding materials with which they are associated. Typical friable materials include acoustical or decorative spray applications, fireproofing, refractory and thermal insulation.

Non-friable material refers to an ACM that is associated with a binding agent (such as tar or cement) that prevents the ready release of airborne fibres. Typical non-friable materials include floor tiles, fire blankets, pre-formed manufactured cementitious insulation and wallboards, pipes, and siding. These materials are generally considered to pose a low hazard provided they remain intact and are not cut or shaped with power tools that are not equipped with a HEPA filtered dust collection system.

Amec Foster Wheeler collected samples of suspected ACMs and submitted them to EMC Labs Inc. (EMC) laboratory in Phoenix, Arizona and Amec Foster Wheeler's lab in Atlanta, Georgia for analysis. Both are National Voluntary Laboratory Accreditation Program (NVLAP) certified laboratories. The samples were analyzed using Polarized Light Microscopy (PLM) methods (EPA 600/R-93/116).

3.0 LEAD and LEAD CONTAINING PAINT

In building construction, lead was frequently used for roofs, cornices, tank linings, electrical conduits, and as a main component of soft solder ally used to seal pipe joints. Lead was also used extensively for pigmentation, sealing, and as a drying agent in oil based paints up until the early 1950's. Exterior paints typically contained up to 60% lead by weight.

In 1976, the Canadian Federal Government introduced the Liquid Coating Materials Regulations under the Federal Hazardous Products Act, restricting the maximum total lead content of paints and other liquid coating materials used in or around premises attended by children or pregnant women to 0.5% by weight (5000 mg/kg). In January 1991, Health Canada negotiated a voluntary reduction of lead content in all Canadian produced consumer paint to a maximum of 0.06%. Recently the Canadian Federal Government enacted the Surface Coating Materials Regulations which reduce the maximum total lead content of any new surface coatings for consumer products to 0.009% (90 mg/kg). This reduction does not generally apply to surface coating applied to buildings or other structures used for agricultural or industrial purposes or as an anti-weathering or anti-corrosive coating.

Northwest Territories *Environmental Protection Act* (EPA) considers a lead containing paint as any structural coating containing greater than 0.06% by weight (600 mg/kg). Surface coatings containing 600 mg/kg or 0.06% lead would be considered to represent a higher risk of exposure

to workers if disturbed during demolition activities. Removal or disturbance of paint coatings exceeding this concentration would require abatement or implementation of appropriate lead dust controls.

The *Guideline for the General Management of Hazardous Waste* describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste lead and lead paint debris. According to the *Guideline for Industrial Waste Discharges in the NT*, the maximum allowable lead content in leachate from solid waste including demolition debris is 5.0 milligrams per liter (mg/L).

In the preparation of this report, Amec Foster Wheeler consulted with Government of the Northwest Territories Environment Division who indicated that the current guidelines are under revision but are still to be followed. They further confirmed that any LCP (greater 600 mg/kg total or greater than 5.0 mg/kg TCLP) are not suitable for disposal at landfills in the Northwest Territories.

The survey included a description of typical building materials suspected to contain lead. Details of location, description, and condition were recorded. The survey included the collection of select bulk samples of readily accessible building materials suspected to contain a surface coating defined as a LCP. Paint chip samples were analyzed in accordance with U.S. EPA SW 846 3050 6010C for lead.

4.0 MERCURY

As part of the survey, Amec Foster Wheeler checked for such items as mercury containing thermostats, switches and lamps. Based on information provided by the U.S. Environmental Protection Agency (EPA), small commercial switches and thermostats may contain 2 to 18 mg of mercury with industrial switches and equipment containing 5 kg or more. According to published literature, older mercury containing lamps, the bulk of which are four foot T-12 fluorescent lamps, can contain up to 80 mg of mercury per lamp. Newer T-12, T-8 and T-5 style fluorescent lamps manufactured since 2000 have in the order of 3 to 12 mg of mercury per lamp. Other types of lamps, such as metal halide and high pressure sodium, can also contain mercury in the order of 20 to 250 mg/lamp.

The Canadian Council of Ministers of the Environment (CCME) *"Canada-Wide Standard for Mercury Containing Lamps"* (2001) is largely geared towards reducing the amount of mercury in lamps at the manufacturing stage; however they do recommend that the release of mercury can be minimized through the proper recycling and disposal of mercury containing lamps.

The *Guideline for the General Management of Hazardous Waste* describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste mercury. According to the Guideline for Industrial Waste Discharges in the NT, the maximum allowable mercury content in leachate from solid waste is 0.1 milligrams per liter (mg/L). The *Guide to Recycling Mercury-Containing Lamps* states that "*testing done in the NWT has confirmed that crushed mercury-containing lamps may not pass the leacheate test and therefore, are managed as hazardous waste*". Waste management and transfer of designated

substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

5.0 POLYCHLORINATED BIPHENYL (PCB)

PCB-containing products were manufactured for use in applications where stable, fire-resistant, and heat-transfer properties were demanded between 1926-29 and 1977. Most PCBs were sold for use as dielectric fluids (insulating liquids) in electric transformers and capacitors. Other uses included heat transfer fluid, hydraulic fluid, dye carriers in carbonless copy paper, plasticizers in paints, adhesives, and caulking compounds. In Canada, PCBs were prohibited from being used in products, equipment, machinery, electrical transformers and capacitors that were manufactured or imported into the country after July 1980. However, older equipment in use after this date may still contain PCBs if the equipment's fluid has not been changed, or if there was sufficient inventory of such equipment.

As part of the survey, Amec Foster Wheeler assessed the Site for the presence of potential PCB-containing materials. Potential PCB-containing equipment or materials were identified by appearance, age and knowledge of current and historical uses of the Site and subject materials. The possible presence of PCBs in the fluorescent or other lamp ballasts was determined based on a visual assessment and the 1991 Environment Canada document entitled "*Identification of Lamp Ballasts Containing PCBs*." Light fixtures were characterized by type and a representative number of fixtures were examined in each functional area of the building, where accessible. Suspect electrical equipment including lighting ballasts was examined, where accessible.

There is a lack of clear Provincial / Territorial / Federal Regulatory framework to provide guidance on PCBs in building construction materials, particularly with respect to non-typical materials such as surface coatings and building materials. The regulations pertaining to PCBs are more related to liquids associated to electrical equipment and contaminated materials as opposed to PCBs in construction materials. The threshold for solid waste process residuals suitable for landfill as listed in the Guideline for Industrial Waste Discharges in the NWT is 50 mg/L by mass. Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

PCBs are also regulated under the Federal Canadian Environmental Protection Act, 1999, PCB Regulation SOR/2008-273 which came into force September 2008 and subsequent amendment regulation SOR 2010-57; (http://www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=105). The Federal PCB regulations generally establish deadlines for ending the use and long term storage of PCBs and products containing PCBs. PCB-containing equipment or any PCB-containing substance with a PCB concentration at or in excess of 2 ppm for liquids and 50 ppm for solids (which pertain to applied surface coatings such as paint) are subject to the above Federal regulations.

Select paint samples were submitted for PCB analysis. Paint samples analysed were determined based on general industry literature which indicated industrial paint coatings exhibiting elastomeric properties or durable paints may contain PCBs. Such coatings may be applied to or used as floor markings, exterior doors, railings and concrete surfaces. Paint samples were randomly selected to get a general representation of the building surveyed. Paint samples were analysed by Amec Foster Wheeler's Edmonton Laboratory.

6.0 OZONE DEPLETING SUBSTANCES

As part of the survey, Amec Foster Wheeler checked for equipment or materials which may contain ODS such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons. Typically these ODSs may be used as refrigerants, propellants, in the manufacture of items such as packaging, insulation, solvents and halon based fire extinguishing agents.

In Canada, the production or import of CFCs were banned in January 1996. CFCs were developed in the 1930s for use as a substitute refrigerant to ammonia. While less damaging to the ozone layer, HCFCs are scheduled to be phased out in Canada between the years 2010 and 2020.

In Canada, the Federal and Provincial governments have legislation in place for ODSs. Federally, ODS is regulated under the Federal Halocarbon Regulations (SOR/2003-289 and amendment regulation SOR/2009-221; (http://ec.gc.ca/ozone/default.asp?lang=En&n=E06A6B0D-1) which are under the authority of the Federal Environmental Protection Act (1999). The purpose of the Federal Halocarbon Regulation is to regulate the use, identification, leak testing and disposal of ODSs on a Federally owned property.

7.0 MOULD

Mould spores are ubiquitous in both indoor and outdoor environments and in the presence of adequate moisture, may pose a concern in a building environment. Suspected mould growth on building materials was identified by visual growth (referred to as suspect visual mould growth; SVG) or evidence of water intrusion / damage. Based on the walk-through and observations Amec Foster Wheeler performed a walk-through visual inspection of the site for evidence of substantial moisture issues and mould reservoirs and/or amplifiers. The presence and extent of any SVG and water damage was determined using reasonable means noting that Amec Foster Wheeler may not have been able to identify all possible fungal reservoirs, as certain materials may be hidden by walls, finishes and equipment.

No samples of SVG were collected as part of the project scope of work.

There are currently no regulations specifically covering exposure to mould and/or mould remediation practices in Canada and there are no occupational exposure limits that define acceptable levels of mould exposure without adverse health effects. Direction on the assessment and remediation of mould in this report is based on the *"Mould Guidelines for the Canadian Construction Industry"* Canadian Construction Association (document CCA82). February 2004.

8.0 REGULATORY REQUIREMENTS

Sections 122.1 and 125.1 of the Canada Labour Code (R.S.C., 1985, c. L-2) and Part X of the Canada Occupational Health and Safety Regulations (SOR/86-304) address asbestos/hazardous substances in federally operated workplaces.

As per the Canada Labour Code:

- Section 122.1: “hazardous substance” includes a hazardous product and a chemical, biological or physical agent that, by reason of a property that the agent possesses, is hazardous to the safety or health of a person exposed to it.
- Section 125.1 Without restricting the generality of section 124 or limiting the duties of an employer under Section 125 but subject to any exceptions that may be prescribed, every employer shall, in respect of every work place controlled by the employer and, in respect of every work activity carried out by an employee in a workplace that is not controlled by the employer, to the extent that the employer controls the activity, (a) ensure that concentrations of hazardous substances in the work place are controlled in accordance with prescribed standards; (b) ensure that all hazardous substances in the work place are stored and handled in the manner prescribed; (c) ensure that all hazardous substances in the work place, other than hazardous products, are identified in the manner prescribed.
- Part X of the Canada Occupational Health and Safety Regulations Section 10.19 (1) states: “An employee shall be kept free from exposure to a concentration of […] (c) airborne chrysotile asbestos in excess of one fibre per cubic centimetre.”

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

Waste management and transfer of designated substances, is defined and outlined under the *Guideline for the General Management of Hazardous Waste in the NWT.*

APPENDIX B
SAMPLE SUMMARY TABLES

TABLE 1: SAMPLING INFORMATION SUMMARY – BULK ASBESTOS
Materials Determined to be Asbestos-Containing

Amec Foster Wheeler Sample No.	Lab ID No.	Photo No.	Sample Location Description	Sample Description	Laboratory Results	
					% Asbestos Fibres	Asbestos Type
ACM-03 - 66 Alder	246168	-	Kitchen	Gypsum Board Joint Compound	3	Chrysotile
ACM-04 - 66 Alder	246169	2	Furnace Room	Gypsum Board Joint Compound	3	Chrysotile
ACM-09 - 66 Alder	246174	-	Furnace Room	Gypsum Board Joint Compound	2	Chrysotile
ACM-14 - 66 Alder	246179	3	Furnace Room	Vinyl sheet flooring (Linoleum)	20	Chrysotile
ACM-15 - 66 Alder	246180	4	Kitchen	Vinyl sheet flooring (Linoleum)	20	Chrysotile
ACM-16 - 66 Alder	246181	-	Bedroom 1 Closet	Gypsum Board Joint Compound	2	Chrysotile
ACM-17 - 66 Alder	246182	5	Bedroom 1	Stucco Ceiling	2	Chrysotile
ACM-18 - 66 Alder	246183	-	Bedroom 2	Gypsum Board Joint Compound	2	Chrysotile
ACM-21 - 66 Alder	246186	-	2nd Storey Landing	Gypsum Board Joint Compound	3	Chrysotile
ACM-22 - 66 Alder	246187	6	Utility Room	Stucco Ceiling	3	Chrysotile
ACM-01 - 68 Alder	246121	7	Lower Level Bathroom	Gypsum Board Joint Compound	2	Chrysotile
ACM-05 - 68 Alder	246125	8	Furnace Room	Linoleum – above original subfloor	25	Chrysotile
ACM-06 - 68 Alder	246126	-	Furnace Room	Stucco Ceiling	2	Chrysotile
ACM-08 - 68 Alder	246128	9	Utility Room (upper level)	Gypsum Board Joint Compound	3	Chrysotile
ACM-09 - 68 Alder	246129	-	Bedroom 1	Linoleum – original layer	25	Chrysotile
ACM-10 - 68 Alder	246130	-	Bedroom 1	Stucco Ceiling	3	Chrysotile
ACM-11 - 68 Alder	246131	10	Upper Level Landing	Stucco Ceiling	2	Chrysotile

TABLE 2: SAMPLING INFORMATION SUMMARY – BULK ASBESTOS
Materials Determined to be Non-Asbestos-Containing

Amec Foster Wheeler Sample No.	Lab ID No.	Photo No.	Sample Location Description	Sample Description	Laboratory Results	
					% Asbestos Fibres	Asbestos Type
ACM-01 - 66 Alder	246166	-	Kitchen	Linoleum – 2nd layer	No asbestos fibres detected	
ACM-02 - 66 Alder	246167	11	Kitchen	Linoleum – surface layer	No asbestos fibres detected	
ACM-05 - 66 Alder	246170	-	Furnace Room	Gypsum Board Joint Compound	No asbestos fibres detected	
ACM-06 - 66 Alder	246171	12	Kitchen	Stucco Ceiling	No asbestos fibres detected	
ACM-07 - 66 Alder	246172	-	Living Room	Stucco Ceiling	No asbestos fibres detected	
ACM-08 - 66 Alder	246173	-	Front Entrance	Linoleum	No asbestos fibres detected	
ACM-10 - 66 Alder	246175	13	Furnace Room	Pipe Wrap - (foil)	No asbestos fibres detected	
ACM-11 - 66 Alder	246176	13	Furnace Room	Foil Duct Tape	No asbestos fibres detected	
ACM-12 - 66 Alder	246177	-	Furnace Room	Linoleum – surface layer	No asbestos fibres detected	
ACM-13 - 66 Alder	246178	-	Furnace Room	Linoleum – 2nd layer	No asbestos fibres detected	
ACM-19 - 66 Alder	246184	-	Bedroom 2	Stucco Ceiling	No asbestos fibres detected	
ACM-23 - 66 Alder	246188	14	Bathroom	Grout on ceramic tile	No asbestos fibres detected	
ACM-24 - 66 Alder	246189	14	Bathroom	Mastic on ceramic tile	No asbestos fibres detected	
ACM-25 - 66 Alder	246190	15	Attic	Mastic associated with rigid insulation	No asbestos fibres detected	
ACM-02 - 68 Alder	246122	16	Furnace Room	Gypsum Board Joint Compound	No asbestos fibres detected	
ACM-03 - 68 Alder	246123	-	Furnace Room	Linoleum	No asbestos fibres detected	
ACM-04 - 68 Alder	246124	-	Furnace Room	Linoleum	No asbestos fibres detected	
ACM-07 - 68 Alder	246127	-	Furnace Room	Foil tape – furnace duct	No asbestos fibres detected	

TABLE 3: LEAD LABORATORY RESULTS, TCLP ANALYSIS RESULTS				
Sample Description and Location	**Laboratory Results Total Lead (mg/kg)**	**Photo No.**	**Amec Foster Wheeler Sample No.**	**Toxicity Characteristic Leaching Procedure (TCLP) mg/L**
Beige to pink paint – kitchen & living room	223	17	PB01 – 66 Alder TCLP01	0.009
White trim – kitchen doorframe to living room	186	-	PB02 – 66 Alder TCLP02	0.317
White paint – furnace room wall	227	-	PBO3 – 66 Alder TCLP03	0.005
Beige over pink – living room	<10	-	PB04 – 66 Alder TCLP04	0.004
Beige – Bedroom 1 (closet)	446	18	PB05 – 66 Alder TCLP05	0.067
Beige – Bedroom 2 (closet)	82	-	PB06 – 66 Alder TCLP06	0.021
White Trim paint – exterior deck column	547	19	PB01 – 68 Alder TCLP07	0.225
Solder – bathroom lower level	319	-	PB02 – 68 Alder	
Paint – back wall, laundry room, below window	<10	-	PB03 – 68 Alder TCLP08	0.007
Back entrance – closet shelf	19	-	PB04 – 68 Alder	
Back deck – exterior – railing	<10	-	PB05 – 68 Alder	
Exterior back deck – planking of surface	33	-	PB06 – 68 Alder TCLP09	0.023
Utility Room – upstairs	161	-	PB07 – 68 Alder	
White paint – bedroom 1 (door trim)	**1020**	20	PB08 – 68 Alder	

APPENDIX C
SITE PHOTOGRAPHS

Photo 1: View of 66 & 68 Alder Drive located in Inuvik, NT.

Photo 2: Sample ACM-04 – 66 Alder; Gypsum board joint compound in kitchen was determined to **contain 3% Chrysotile asbestos fibres.**

Photo 3: Sample ACM-14 – 66 Alder; Vinyl roll flooring located beneath layers of flooring and subfloor within the furnace room was determined to **contain 20 % Chrysotile asbestos fibres.**

Photo 4: Sample ACM-15 – 66 Alder; Vinyl roll flooring located beneath layers of flooring and subfloor within the kitchen was determined to **contain 20 % Chrysotile asbestos fibres.**

Photo 5: Sample ACM-17 – 66 Alder; Texture finish (stipple) on ceiling in 2nd floor bedroom was determined to **contain 2% Chrysotile asbestos fibres.**

Photo 6: Sample ACM-22 – 66 Alder; Texture finish (stipple) on ceiling in 2nd floor utility room was determined to **contain 2% Chrysotile asbestos fibres.**

66 & 68 Alder Drive, Inuvik, Northwest Territories	Photo Date: January 2016	Project No.: TV147020	Figure 1

Photo 7: Sample ACM-01 – 68 Alder; Gypsum board joint compound in main floor bathroom was determined to **contain 2% Chrysotile asbestos fibres.**

Photo 8: Sample ACM-05 – 68 Alder; Vinyl roll flooring located beneath layers of flooring and subfloor within the furnace room was determined to **contain 25% Chrysotile asbestos fibres.**

Photo 9: Sample ACM-08 - 68 Alder; Gypsum board joint compound in 2nd floor utility room was determined to **contain 3% Chrysotile asbestos fibres.**

Photo 10: Sample ACM-11 – 68 Alder; Texture finish (stipple) on ceiling in upper level landing was determined to **contain 2% Chrysotile asbestos fibres.**

Photo 11: Sample ACM-01 and ACM-02 – 66 Alder; Vinyl roll flooring surface layers within the kitchen. No asbestos fibres detected.

Photo 12: Sample ACM-06 – 66 Alder; Texture finish (stipple) on ceiling in kitchen. No asbestos fibres observed.

66 & 68 Alder Drive, Inuvik, Northwest Territories	Photo Date: January 2016	Project No.: TV147020	Figure 2

Photo 13: Samples ACM-10 and ACM-11 – 66 Alder; pipe insulation and duct tape, respectively, associated with the furnace. No asbestos fibres detected.

Photo 14: Samples ACM-23 and ACM-24 – 66 Alder; Grout and mastic associated with ceramic tiles in the bathroom. No asbestos fibres detected.

Photo 15: Sample ACM-25 – 66 Alder; Rigid insulation and black mastic from the attic space. No asbestos fibres detected.

Photo 16: Sample ACM-02 – 68 Alder; gypsum board joint compound in furnace room. No asbestos fibres detected.

Photo 17: Sample PB-01 – 66 Alder; white over pink paint in the kitchen and living room was determined to have a total lead concentration of 223 mg/kg and a TCLP concentration of 0.009 mg/L.

Photo 18: Sample PB-05 – 66 Alder; beige paint located in 2nd floor bedroom was determined to have a total lead concentration of 446 mg/kg and a TCLP concentration of 0.067 mg/L.

66 & 68 Alder Drive, Inuvik, Northwest Territories	Photo Date: January 2016	Project No.: TV147020	Figure 3

Photo 19: Sample PB-01 – 68 Alder; white paint located on exterior deck column was determined to have a total lead concentration of 223 mg/kg and a TCLP concentration of 0.225 mg/L.

Photo 20: Sample PB-08 – 68 Alder; white paint on door trim of 2nd floor bedroom was determined to have a total lead concentration of 1020 mg/kg.

Photo 21: View of mercury containing thermostat observed in the living room of 68 Alder Drive.

Photo 22: View of typical fluorescent light fixture located beneath kitchen cabinets, note the mercury containing light tube.

Photo 23: View of ballast associated with fluorescent light fixture in 66 Alder Drive, labelled as non-PCB.

Photo 24: View of the crawlspace and foundation beneath the building.

66 & 68 Alder Drive, Inuvik, Northwest Territories	Photo Date: January 2016	Project No.: TV147020	Figure 4

APPENDIX D
LABORATORY CERTIFICATES OF ANALYSES

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Inuvik Hazmat	AMEC Job No. :	TV147020
Project :	66 Adler	Report Date :	2/5/2016
Client Project No.:	N/A	Sample Date :	18-Jan-2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 2/ 5/2016, twenty-six (26) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246166	Linoleum kitchen, 2nd layer ACM 01- 66Alder	None Detected-Sheet Flooring
246167	Linoleum kitchen, surface layer ACM 02- 66Alder	None Detected-Sheet Flooring
246168	Drywall joint compound kitchen ACM 03- 66Alder	3% Chrysotile-Joint Compound
246169	Drywall joint compound furnace room ACM 04- 66Alder	3% Chrysotile-Joint Compound
246170	Stucco ceiling furnace room ACM 05- 66Alder	None Detected-Stucco Ceiling
246171	Stucco ceiling kitchen ACM 06- 66Alder	None Detected-Stucco Ceiling
246172	Stucco ceiling living room ACM 07- 66Alder	None Detected-Stucco Ceiling

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be the client's and recipients sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

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On 2/ 5/2016, twenty-six (26) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246173	Linoleum front entrance ACM 08- 66Alder	None Detected-Sheet Flooring
246174	Drywall joint compound furnace room ACM 08- 66Alder	2% Chrysotile-Joint Compound
246175	Pipe wrap, foil furnace room ACM 10- 66Alder	None Detected-Wrap
246176	Foil duct tape on furnance furnace room ACM 11- 66Alder	None Detected-Foil Duct Tape
246177	linoleum surface furnace room ACM 12- 66Alder	None Detected-Sheet Flooring
246178	linoleum layer below ACM 12 furnace room ACM 13- 66Alder	None Detected-Sheet Flooring
246179	linoleum layer above original subfloor furnace room ACM 14- 66Alder	20% Chrysotile-Sheet Flooring

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On 2/ 5/2016, twenty-six (26) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246180	linoleum layer above original subfloor kitchen ACM 15- 66Alder	20% Chrysotile-Sheet Flooring
246181	Drywall joint compound Bedroom 1 Closet ACM 16- 66Alder	2% Chrysotile-Joint Compound
246182	Stucco ceiling Bedroom 1 ACM 17- 66Alder	2% Chrysotile-Stucco Ceiling
246183	Drywall joint compound Bedroom 2 ACM 18- 66Alder	2% Chrysotile-Joint Compound
246184	Stucco ceiling Bedroom 2 ACM 19- 66Alder	None Detected-Stucco Ceiling
246185	Drywall joint compound ACM 20- 66Alder	3% Chrysotile-Joint Compound
246186	Drywall joint compound 2nd Floor Landing ACM 21- 66Alder	3% Chrysotile-Joint Compound

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be the client's and recipients sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

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Client Project No.:	N/A	Sample Date :	18-Jan-2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 2/ 5/2016, twenty-six (26) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246187	Stucco ceiling utility room ACM 22- 66Alder	3% Chrysotile-Joint Compound
246188	Tile Grout bathroom ACM 23- 66Alder	None Detected-Grout
246189	Tile mastic bathroom ACM 24- 66Alder	None Detected-Tan Mastic
246190	Roof shingle/tar above plywood, utility room ACM 25- 66Alder	None Detected-Roof Tar
246191	Stucco ceiling DUP 2- 66Alder	Not Analyzed-Stucco Ceiling

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be the client's and recipients sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

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Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

STATEMENT OF LABORATORY ACCREDITATION

These samples were analyzed at the Atlanta Branch of Amec Foster Wheeler Environment & Infrastructure, Inc. in the Asbestos Laboratory at 2677 Buford Hwy, Atlanta, GA, 30324. The laboratory holds accreditation from the National Institute of Standards and Technology (formerly National Bureau of Standards) under the National Voluntary Laboratory Accreditation Program (NVLAP). This laboratory also is licensed and authorized to perform as an Asbestos Laboratory in the State of Texas within the purview of Texas Occupations Code, chapter 1954, so long as this license is not suspended or revoked and is renewed according to the rules adopted by the Texas Board of Health.

The samples were analyzed by polarized light microscopy in general accordance with the procedures described in the Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116. The results of each bulk sample analysis relate only to the material tested. This report shall not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

Specific questions concerning bulk sample results shall be directed to the PLM Laboratory Manager.

Analyst : James Findlay

PLM Laboratory Manager : Tom D. Morrison

Approved Signatory . _____

NVLAP
LAB CODE 101066-0

PLM REPORT SUMMARY

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Client :	Inuvik Hazmat	AMEC Job No. :	TV147020
Project :	68 Alder	Report Date :	2/5/2016
Client Project No.:	N/A	Sample Date :	18-Jan-2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 2/ 3/2016, twelve (12) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246121	Drywall joint compound lower level bathroom ACM 01- 66Alder	2% Chrysotile-Joint Compound
246122	Drywall joint compound furnace room ACM 02- 66Alder	None Detected-Joint Compound
246123	Linoleum furnace room ACM 03- 66Alder	None Detected-Sheet Flooring
246124	Linoleum furnace room ACM 04- 66Alder	None Detected-Sheet Flooring
246125	Linoleum above original subfloor, furnance room ACM 05- 66Alder	25% Chrysotile-Sheet Flooring
246126	Stucco ceiling furnace room ACM 06- 66Alder	2% Chrysotile-Stucco Ceiling
246127	Foil tape of furnance duct furnace room ACM 07- 66Alder	None Detected-Metal Foil

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client : Inuvik Hazmat
AMEC Job No. : TV147020
Project : 68 Alder
Report Date : 2/5/2016
Client Project No.: N/A
Sample Date : 18-Jan-2016
Identification : Asbestos, Bulk Sample Analysis
Test Method : Polarized Light Microscopy / Dispersion Staining (PLM/DS)
EPA 600/M4-82-020 / EPA Method 600/R-93/116

On 2/ 3/2016, twelve (12) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246128	Drywall joint compound utility room, upper level ACM 08- 66Alder	3% Chrysotile-Joint Compound
246129	Linoleum original layer, Bedroom 1 ACM 09- 66Alder	25% Chrysotile-Sheet Flooring
246130	Stucco ceiling Bedroom 1 ACM 10- 66Alder	3% Chrysotile-Stucco Ceiling
246131	Stucco ceiling upper level landing ACM 11- 66Alder	2% Chrysotile-Stucco Ceiling
246132	Stucco ceiling	None Detected-Stucco Ceiling

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be the client's and recipients sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Inuvik Hazmat	AMEC Job No. :	TV147020
Project :	68 Alder	Report Date :	2/5/2016
Client Project No.:	N/A	Sample Date :	18-Jan-2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

STATEMENT OF LABORATORY ACCREDITATION

These samples were analyzed at the Atlanta Branch of Amec Foster Wheeler Environment & Infrastructure, Inc. in the Asbestos Laboratory at 2677 Buford Hwy, Atlanta, GA, 30324. The laboratory holds accreditation from the National Institute of Standards and Technology (formerly National Bureau of Standards) under the National Voluntary Laboratory Accreditation Program (NVLAP). This laboratory also is licensed and authorized to perform as an Asbestos Laboratory in the State of Texas within the purview of Texas Occupations Code, chapter 1954, so long as this license is not suspended or revoked and is renewed according to the rules adopted by the Texas Board of Health.

The samples were analyzed by polarized light microscopy in general accordance with the procedures described in the Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116. The results of each bulk sample analysis relate only to the material tested. This report shall not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

Specific questions concerning bulk sample results shall be directed to the PLM Laboratory Manager.

Analyst : James Findlay

PLM Laboratory Manager : Tom D. Morrison

Approved Signatory : 

NVLAP
LAB CODE 101066-0

Final Analytical Report

Attention: Paul Houle

Amec Foster Wheeler Environment & Infrastructure
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Results for File: EC-70516

Project Number: TV147020
Project Name: Inuvik HazMat

Date Received: 2016/01/28
Date of Report: 2016/02/08

Report reviewed by:

Jesse Dang, B.Sc.
Manager
Laboratory Services

Kristine Connor
Director of QA/QC
Laboratory Services

** All samples will be disposed of after 30 days following analysis. Please contact the lab if you require additional sample storage time. (Samples deemed hazardous will be returned to the client at their own expense or disposal will be arranged.) **

Paint Analysis

Project No. TV147020

Final
File No. EC-70516

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1545 PB01 - 66 Alder 2016/01/18 10:20	16-1546 PB02 - 66 Alder 2016/01/18 10:25	16-1547 PB03 - 66 Alder 2016/01/18 10:40	16-1548 PB04 - 66 Alder 2016/01/18 10:55
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	223	186	227	< 10
LL	2016/01/29	Lead	%	Calc	0.0010	0.0223	0.0186	0.0227	< 0.0010

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1549 PB05 - 66 Alder 2016/01/18 11:10	16-1550 PB06 - 66 Alder 2016/01/18 11:20	16-1551 TCLP01 - 66 Alder 2016/01/18 11:55	16-1552 TCLP02 - 66 Alder 2016/01/18 12:10
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	---	---	0.009	0.317
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	446	82	---	---
LL	2016/01/29	Lead	%	Calc	0.0010	0.0446	0.0082	---	---

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1553 TCLP03 - 66 Alder 2016/01/18 12:30	16-1554 TCLP04 - 66 Alder 2016/01/18 12:45	16-1555 TCLP05 - 66 Alder 2016/01/18 13:20	16-1556 TCLP06 - 66 Alder 2016/01/18 13:35
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	0.005	0.004	0.067	0.021

Quality Control Standard

Project No. TV147020 File No. EC-70516

Paint Analysis

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Analyzed Value	Advisory Range	Target Value	Reference No.
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.215	0.188-0.455	0.321	ERA D079-544
TY	2016/02/01	Lead	µg/g (ppm)	EPA 3050/6010	93	75-125	100	Metal-1

Analytical Comments

Project No. TV147020 File No. EC-70516

All Analytical results pertain to samples analyzed as received.

DL - Detection Limit

EPA: U.S. Environmental Protection Agency. 1997. Test Methods of Evaluation of Solid Waste 3rd Ed through Update III. Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

Final Analytical Report

Attention: Paul Houle

Amec Foster Wheeler Environment & Infrastructure
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Results for File: EC-70515

Project Number: TV147020
Project Name: Inuvik HazMat

Date Received: 2016/01/28
Date of Report: 2016/02/08

Report reviewed by:

Jesse Dang, B.Sc.
Manager
Laboratory Services

Kristine Connor
Director of QA/QC
Laboratory Services

** All samples will be disposed of after 30 days following analysis. Please contact the lab if you require additional sample storage time. (Samples deemed hazardous will be returned to the client at their own expense or disposal will be arranged.) **

Paint Analysis

Project No. TV147020

Final
File No. EC-70515

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1533 PB01 - 68 Alder 2016/01/18 14:00	16-1534 PB02 - 68 Alder 2016/01/18 14:30	16-1535 PB03 - 68 Alder 2016/01/18 14:40	16-1535-D PB03 - 68 Alder Lab Duplicate
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	547	319	< 10	< 10
LL	2016/01/29	Lead	%	Calc	0.0010	0.0547	0.0319	< 0.0010	< 0.0010

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1536 PB04 - 68 Alder 2016/01/18 14:50	16-1537 PB05 - 68 Alder 2016/01/18 15:00	16-1538 PB06 - 68 Alder 2016/01/18 15:15	16-1539 PB07 - 68 Alder 2016/01/18 15:25
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	19	< 10	33	161
LL	2016/01/29	Lead	%	Calc	0.0010	0.0019	< 0.0010	0.0033	0.0161

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1540 PB08 - 68 Alder 2016/01/18 15:35	16-1541 Dup 2 - 68 Alder 2016/01/18 15:35	16-1542 TCLP07 - 68 Alder 2016/01/18 15:45	16-1543 TCLP08 - 68 Alder 2016/01/18 15:55
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	---	---	0.225	0.007
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	1020	862	---	---
LL	2016/01/29	Lead	%	Calc	0.0010	0.1024	0.0862	---	---

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1544 TCLP09 - 68 Alder 2016/01/18 16:10	16-1544-D TCLP09 - 68 Alder Lab Duplicate
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	0.023	0.022

Quality Control Standard

Project No. TV147020 File No. EC-70515

Paint Analysis

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Analyzed Value	Advisory Range	Target Value	Reference No.
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.215	0.188-0.455	0.321	ERA D079-544
TY	2016/02/01	Lead	µg/g (ppm)	EPA 3050/6010	93	75-125	100	Metal-1

Analytical Comments

Project No. TV147020 File No. EC-70515

All Analytical results pertain to samples analyzed as received.

DL - Detection Limit

EPA: U.S. Environmental Protection Agency. 1997. Test Methods of Evaluation of Solid Waste 3rd Ed through Update III. Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

DESIGNATED SUBSTANCES SURVEY

Detached Four Bedroom Residence
15 Nanuk Place,
Inuvik, Northwest Territories

Submitted to:

Mr. Mike Molinski

Public Works Government Services Canada
100-167 Lombard Avenue
Winnipeg, Manitoba R3S 0T6

Submitted by:

Amec Foster Wheeler
Environment & Infrastructure
A Division of Amec Foster Wheeler Americas Limited
440 Dovercourt Drive
Winnipeg, Manitoba R3Y 1N4
204-488-2997

22 February 2016

Amec Foster Wheeler Project No. TV147020

EXECUTIVE SUMMARY

Public Works and Government Services Canada (PWGSC) retained Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler) conducted a designated substances survey (DSS) of a detached four bedroom residential building located at 15 Nanuk Place, in Inuvik, Northwest Territories (the 'Site'). The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and the warehouse.

The purpose of the survey was to assess the building for the presence of specific hazardous substances; namely potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing equipment, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs) in light ballasts, silica, suspect visible mould growth (SVG) and toxic characteristic leaching procedure (TCLP) testing for lead.

At the time of the Site inspection, the property was developed as a two storey, wood frame residential building constructed on wood pilings. The building was reported by PWGSC to have been vacant for a period of eight years and constructed in 1959.

Based on Amec Foster Wheeler's field assessment and laboratory results, identified ACMs included vinyl roll flooring (linoleum) observed in the dining room (and lower level landing), vinyl floor tile observed in the master bedroom and adjoining bedroom), gypsum board joint compound observed throughout the building, and vermiculite observed throughout the attic. Amec Foster Wheeler recommends that identified ACMs be removed using Low, Moderate and High Risk asbestos abatement procedures.

Amec Foster Wheeler was unable to access the roof due to height. No samples were collected of roofing materials. Additional evaluation of the roof should be considered in the event of renovation or demolition as ACMs may be present in the roofing materials.

Amec Foster Wheeler identified several LCP surface coatings which may be affected by building renovation or demolition activities. LCP was confirmed in interior paints on both levels and the exterior deck paints. Three of the four samples collected were above the total lead content for disposal at a regular landfill, with one sample exceeding the TCLP applicable regulatory value and thus considered hazardous waste for the purpose of disposal.

Ballasts in the light fixture were observed to be non-PCB containing. Amec Foster Wheeler considers it good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed.

Amec Foster Wheeler observed one mercury containing thermostat on the Site. Prior to demolition activities, all mercury-containing equipment must be removed and disposed of in accordance with regulatory requirements.

There was no equipment or others materials suspected of containing ODSs other than one domestic refrigerator. All equipment suspected of containing ODSs should be inspected by a qualified technician prior to removal or disposal and if found to contain ODS, the unit must be decommissioned in accordance with federal and territorial regulations.

It was reported by PWGSC that a significant water damage event occurred in the building approximately eight years ago and that subsequent to the event, sections of gypsum board were replaced throughout the building. PWGSC reported that the building interior had been untouched since the water damage event repairs. Amec Foster Wheeler observed water damage in the kitchen in the former location of the sink cabinetry along both the wall and sub-floor. Water damage was also observed on replaced sections of gypsum board below the master bedroom windows, and on replaced sections of gypsum board (walls and ceiling) in the bathroom. Water damage and SVG were observed on the bathroom floor and also on the underside of VRF in the side entrance. SVG may also have occurred within enclosed spaces and may have not been evident during the Site walk through.

Removal of water damaged materials and those affected by mould would not be required as part of a building demolition provided appropriate worker protection measures were implemented. In the event of renovation, Level I and II mould abatement precautions would be anticipated to required, however a more detailed destructive investigation would be required to confirm the extent of the water damage and possible mould. Based on the partial renovation work completed to date and the apparent on-going water incursion issues, Amec Foster Wheeler suspects hidden SVG and water incursion issues.

Further discussion of the identified designated substances and recommendations are provided in the body of this report.

TABLE OF CONTENTS

EXECUTIVE SUMMARY ..... **I**

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE **1**

1.1 SCOPE OF WORK 1

2.0 DESCRIPTION OF SITE **1**

3.0 SURVEY RESULTS **2**

3.1 ASBESTOS-CONTAINING MATERIALS 3
3.2 LEAD AND LEAD-CONTAINING PAINT 4
3.3 MERCURY CONTAINING DEVICES 4
3.4 OZONE DEPLETING SUBSTANCES 5
3.5 POLYCHLORINATED BIPHENYLS 5
3.6 SUSPECT VISUAL MOULD GROWTH AND WATER DAMAGE 5

4.0 RECOMMENDATIONS **5**

4.1 ASBESTOS-CONTAINING MATERIALS 5
4.2 LEAD AND LEAD CONTAINING 6
4.3 MERCURY CONTAINING DEVICES 7
4.4 OZONE DEPLETING SUBSTANCE 7
4.5 POLYCHLORINATED BIPHENYLS 7
4.6 SUSPECT VISIBLE GROWTH & WATER DAMAGE 7
4.7 OTHER RECOMMENDATIONS 8

5.0 SURVEY LIMITATIONS **8**

6.0 CLOSURE **9**

LIST OF APPENDICES

Appendix A Survey Definitions and Methodology
Appendix B Sampling Summary Tables
Appendix C Site Photographs
Appendix D Laboratory Certificates of Analyses

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler), was retained by Public Works and Government Services Canada (PWGSC) to conduct designated substances survey of a detached four bedroom residential building located at 15 Nanuk Place, in Inuvik, NT (the 'Site'). The Site is a vacant two storey residential building with an above ground crawlspace constructed on wood pilings.

Amec Foster Wheeler understands that the purpose of the survey was to assess the structure for the presence of specific designated substances (DS) that may require special handling prior to renovation or demolition activities. Specific DS to be surveyed for included potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing devices, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs), and suspect visible mould growth (SVG). Amec Foster Wheeler understands that the building is not currently scheduled for demolition.

The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and warehouse.

1.1 SCOPE OF WORK

As stipulated in Amec Foster Wheeler's proposal dated 21 December 2015, the proposed scope of work was to include the following activities. The scope of work encompassed the completion of the following tasks for eight residential and two industrial buildings, each located in Inuvik, Northwest Territories.

- Conduct a DS survey of existing structure, including field and laboratory testing to confirm the presence/absence of materials of concern;
- Where reasonable within the context of the project budget and scope, provide quantities of DS associated with the building structure; and
- Prepare a DSS report for each individual structure.

Amec Foster Wheeler completed the above tasks for accessible areas within the subject building. Areas which were not accessible included the roof as the roof could not be safely access with a ladder. A detailed summary of Amec Foster Wheeler's sampling methodology and definitions associated with the designated substances of concern are provided in Appendix A.

Amec Foster Wheeler completed the field assessment portion of the above scope of work on 22 January 2016. PWGSC did not provide Amec Foster Wheeler any reports on the building for review.

2.0 DESCRIPTION OF SITE

At the time of the Site inspection, the property was developed with a detached four bedroom residence. The building was of two storey construction with an above ground crawlspace constructed on wood pilings. The crawlspace was enclosed and heated with access provided

via an exterior access hatch. The building was reported by PWGSC to have been vacant for a period of eight years and constructed in 1959.

The building was generally in fair condition and was observed to have been left in a state of partial renovation. PWGSC reported that a significant water damage event occurred in the building approximately eight years ago and that subsequent to the event, sections of gypsum board were replaced throughout the building. PWGSC reported that the building interior had been untouched since the water damage event repairs. There was evidence of water incursion issues which may be related to humidity or other issues, including after the repairs were initiated, which were not apparent. The dwelling was heated and had electrical services at the time of the Site visit.

The general Site construction details were as follows:

Exterior Walls:	The exterior walls of the building were observed to be wood framing finished with vinyl clad siding.
Roof:	The roof was observed from the ground to be pitched, and finished with shingles. The roof was not accessed due to the height and observation was limited due to heavy snow cover. An attic space was present and observed through an access hatch. The attic space was insulated with fiberglass and vermiculite insulation.
Interior Walls:	Interior walls consisted of painted gypsum board. Sections of unfinished gypsum board were evident in repair/renovation areas.
Floor:	The flooring consisted of a combination of vinyl roll flooring (commonly referred to as linoleum), vinyl floor tile and carpet.
Interior Ceilings:	The ceilings consisted of painted gypsum board. Sections of unfinished gypsum board were evident in renovation areas.
Lighting:	Lighting was provided by incandescent bulbs with the exception of one fluorescent light fixture.
Mechanical:	Heating was provided by a natural gas fired boiler located in the crawlspace.

Site photographs taken at the time of the site visit are provided in Appendix C.

3.0 SURVEY RESULTS

Ms. Karen Fortin and Mr. Mark Miller of Amec Foster Wheeler coordinated site inspection activities with Mr. Wally Ballas of PWGSC (Inuvik) who provided access and Site information for each of the structures.

Amec Foster Wheeler conducted a visual assessment of all accessible areas of the building as outlined in Appendix A: Survey Definitions and Methodology.

Photographs showing the Site condition and sample locations are provided in Appendix C.

3.1 ASBESTOS-CONTAINING MATERIALS

During the survey of the Site, Amec Foster Wheeler collected samples of suspect ACMs which were submitted to Amec Foster Wheeler's laboratory in Atlanta, Georgia for confirmatory laboratory analysis. A total of nineteen samples of approximately 12 separate materials were collected and submitted for analysis. The results of Amec Foster Wheeler's ACM sampling activities are summarized in Tables 1 and 2 of Appendix B, digital photographs of representative sampled materials are included in Appendix C, and the laboratory certificates of analysis are included in Appendix D.

ACMs identified include the following. All materials were generally observed in fair to good condition.

a) **Vinyl roll flooring (friable backing)** - observed in the dining room (and lower level landing) was determined to contain 20% Chrysotile asbestos fibres based on sample ACM-02 (Photo 4).
b) **Vinyl floor tile (non-friable)** - observed in the master bedroom (and adjoining bedroom) was determined to contain 5% Chrysotile asbestos fibres based on sample ACM-10 (Photo 7).
c) **Gypsum board joint compound (friable)** - observed throughout the building was determined to contain between 3% - 5% Chrysotile asbestos fibres based on samples ACM-06, ACM-08, ACM-12, ACM-13, and ACM-14.
d) **Vermiculite (friable)** - was observed throughout the attic. Three separate samples were collected and found to contain Actinolite asbestos fibres based on samples ACM-15, ACM-16 and ACM-17. The vermiculite was observed to be comingled with pink fibreglass insulation (Photos 11 & 12).

There were a number of other suspect ACMs present in the building that were sampled and, based on the laboratory analysis undertaken, are <u>not</u> considered to be ACMs including the following. These materials are listed in Table 1, Appendix B.

- Vinyl roll flooring (VRF) observed in the kitchen and front and side entrance (1 sample); VRF observed in laundry room (1 sample)
- Vinyl floor tiles (VFT) observed in the dining room and living room, pantry, upstairs landing and utility room (1 sample); VFT observed in 2 bedrooms opposite side of master bedroom (1 sample);
- Insulation backing observed in attic (1 sample); and
- Exterior housing wrap (1 sample).

Amec Foster Wheeler was unable to access the roof due to height. No samples were collected of roofing materials.

ACMs may be present in forms that were not observed or sampled during the Site inspection including, but not limited to, caulking, fire rated doors, thermal insulating materials such as gaskets associated with mechanical equipment, wiring and electrical components, packing associated with cast iron pipe joints, or in areas that were not accessible at the time of the survey.

For the purpose of renovation, demolition, or any other alteration or disturbance, all suspect ACMs, unless confirmed through sampling and analysis, should be considered to contain asbestos and handled in accordance with a written work plan that references current Territorial guidelines as presented in the *Northwest Territories & Nunavut Code of Practice on Asbestos Abatement"* (2012).

3.2 LEAD AND LEAD-CONTAINING PAINT

Based on the date of original building construction (1959), there is a potential that LCP and other lead containing materials may have been used during construction of the original building or subsequent renovations. Amec Foster Wheeler submitted four samples of paint (PB-01 to PB-04) for laboratory analysis. At the discretion of the assessor, sampled items included representative interior walls and exterior decks. The paint on the interior walls was also generally present on the trim located throughout the building. As explained in the report methodology, the sampling program considered typical paint coatings and not all surfaces were tested and mechanical equipment was not sampled. The samples were submitted to Amec Foster Wheeler's laboratory in Edmonton, Alberta for analysis of total lead content. The total lead concentration of the paint samples ranged from <10 mg/Kg (parts per million) to 38,900 mg/Kg (ppm). The highest total lead concentration was determined to be 38,900 mg/Kg from the grey paint sample (with various sub-layers) collected from the front deck decking (PB02).

As discussed in the Methodology Section, surface coatings with a lead content greater than 0.06% by weight (600 mg/kg) considered to be LCPs for the purposes of this report. Laboratory results show that all but one (PB01) of the four samples collected are considered to be LCP.

Amec Foster Wheeler also submitted three of the above samples for further analysis using the toxicity characteristic leaching procedure (TCLP). According to the *Guideline for Industrial Waste Discharges* in the Northwest Territories, the maximum allowable lead content in leachate from demolition debris is 5.0 milligrams per liter (mg/L). TCLP sample 39 (front deck – decking) collected by Amec Foster Wheeler was 30.8 mg/L, above maximum allowable lead content for solid waste.

Results of the laboratory analyses are summarized in Table 3 (Appendix B), digital photographs of the sample locations are included in Appendix C, and the Laboratory's Certificates of Analyses are included in Appendix D.

Based on the visual survey of the building, other products on-Site that may contain lead include copper plumbing fixture solders, plumbing fittings, cable coverings, and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials.

3.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler observed one wall mounted mercury-containing thermostat on the Site. (Photo 15). Other potential mercury containing equipment includes switches and thermostats

associated with the building mechanical systems; however Amec Foster Wheeler did not observe any such equipment at the Site.

3.4 OZONE DEPLETING SUBSTANCES

Amec Foster Wheeler observed one refrigerator which is suspected to contain ozone depleting substances.

All equipment suspected of containing ODSs should be inspected by a qualified technician prior to removal or disposal and if found to contain ODS, the unit must be decommissioned in accordance with federal and Territorial regulations.

3.5 POLYCHLORINATED BIPHENYLS

One fluorescent light fixture was observed, located in the kitchen. Amec Foster Wheeler inspected the ballast which was labelled as containing “No PCBs.”

3.6 SUSPECT VISUAL MOULD GROWTH AND WATER DAMAGE

It was reported that a significant water damage event occurred in the building approximately eight years ago and that subsequent to the event, sections of gypsum board were replaced throughout the building. It was reported that the building interior had been untouched since the water damage event repairs. Kitchen cabinetry was observed in the living room during the Site visit, and plumbing fixtures were observed in one of the bedrooms.

Amec Foster Wheeler observed water damage in the kitchen in the former location of the sink cabinetry along both the wall and sub-floor (Photo 17), on replaced sections of gypsum board below the master bedroom windows (Photo 18), and on replaced sections of board (walls and ceiling) in the bathroom (Photo 18).

Evidence of water damage and suspect visible growth (SVG) was observed on the bathroom floor (Photo 20), and also on the underside of VRF in the side entrance (Photo 22).

4.0 RECOMMENDATIONS

Demolition and other recommendations for the materials identified in the building are provided below. It is assumed that all work will be completed on the vacant building in an area restricted to the public. All demolition activities shall be carried out in accordance with CSA standard S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures, the National Building Code Section 8 (Safety Measures at Construction and Demolition Sites) and other related sections.

All work shall be completed by qualified workers following written safe work procedures, in accordance with requirements of the General Safety Regulation, under the *Northwest Territories Safety Act*.

4.1 ASBESTOS-CONTAINING MATERIALS

Recommendations for the removal of ACMs identified in each of the proposed work areas are provided below. Completion of any of these recommendations must be performed by qualified

asbestos workers or abatement contractors and in accordance with a written work plan prepared based on existing current Territorial regulations and/or guidelines.

a) **Vinyl roll flooring (friable backing, approximately 16 m^2)** - observed in the dining room (and lower level landing) may be removed following Moderate Risk abatement activities.
b) **Vinyl floor tiles (non-friable) – approximately 25 m^2**) - observed in the master bedroom (and adjoining bedroom) may be removed following Low Risk asbestos abatement procedure.
c) **Gypsum board joint compound (friable, approximately 496 m^2)** - observed throughout the building on walls and ceilings may be removed following Moderate Risk asbestos abatement procedures.
d) **Vermiculite and comingled fibreglass insulation (friable – approximately 60 m^2)** - observed throughout the attic may be removed following High Risk asbestos abatement procedures.

Additional evaluation of the roof should be considered in the event of demolition or removal of the shingles as ACMs may be present in the roofing materials.

4.2 LEAD AND LEAD CONTAINING

Amec Foster Wheeler identified three LCP surface coatings which may will affected by building renovation or demolition activities. These are not suitable for disposal at a landfill in the Northwest Territories and a suitable disposal location will need to be identified.

One of the TCLP samples collected by Amec Foster Wheeler was above the maximum allowable lead leachate concentration for demolition debris. These are not suitable for disposal at a landfill in the Northwest Territories and will need to be considered as hazardous waste for disposal. It is anticipated that the LCP coated building materials would be disposed as one unit rather than the LCP removed.

The remaining painted demolition debris is expected to be disposed of at most construction landfills without restrictions, however this should be confirmed with the landfill receiving the demolition waste prior to demolishing the building so that any requirements for special handling or disposal can be determined and suitable arrangement made.

Based on the visual survey of the building, other products on Site that may contain lead include copper plumbing fixture solders, plumbing fittings, cable coverings, and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials.

All workers who may be exposed to lead must undergo hazard specific awareness training. All workers who may be performing activities that may create airborne lead dust, such as grinding, cutting, sandblasting or welding, should wear personal protective equipment including appropriate respiratory equipment, dermal protection and disposable coveralls. As lead containing paint poses a greater concern when heated, such as during welding operations, it is considered good practice to remove lead containing paint from surfaces to be welded or

otherwise heated. Workers should also follow appropriate decontamination procedures prior to leaving the work area.

4.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler observed one wall mounted mercury-containing thermostat on the Site. Prior to demolition activities all mercury-containing equipment must be removed. Where possible, the fluorescent lamps (if present) should be recycled and the mercury collected from thermostats.

4.4 OZONE DEPLETING SUBSTANCE

Amec Foster Wheeler observed one refrigerator which is suspected to contain ozone depleting substances. Any suspect equipment discovered during demolition/renovation, should be inspected for the presence of ODSs and handled or disposed of in accordance with current Federal and Territorial regulations which shall be completed by trained and qualified technicians.

4.5 POLYCHLORINATED BIPHENYLS

One fluorescent light fixture was observed on Site. The ballast was labelled to be non-PCB containing. It is considered good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed. If 'non-PCB' or 'No PCBs' labelling is not found on the ballasts, the ballasts should be compared to information obtained from the manufacture to determine PCB content. If the PCB content of the ballast cannot be determined, the ballast should be assumed to contain PCBs unless laboratory testing indicates otherwise. All PCB-containing ballasts, known or assumed, must be stored and transported in accordance with applicable Territorial and Federal hazardous waste and transportation of dangerous goods legislation.

4.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE

Amec Foster Wheeler observed water damage in the kitchen in the former location kitchen sink cabinetry along both the wall and sub-floor, on replaced sections of gypsum board below the master bedroom windows, on replaced sections of board (walls and ceiling) in the bathroom.

Evidence of water damage and suspect visible growth was observed on the bathroom floor and also on the underside of VRF in the side entrance. SVG may also have occurred within enclosed spaces and may have not been evident during the Site walk through. In the event of renovation, Level I and II mould abatement precautions would be anticipated to be required, however a more detailed destructive investigation would be required to confirm the extent of the water damage and possible mould. Based on the partial renovation work completed to date and the apparent on-going water incursion issues, Amec Foster Wheeler suspects hidden SVG and water incursion issues.

Amec Foster Wheeler does not recommend removal of these materials prior to demolition. However, as workers will be required to enter this area for the purposes of asbestos-abatement and other demolition activities, workers should be informed of the hazards associated with mould and provided with personal protective equipment appropriate to the specific task. In order to minimize worker exposure, Amec Foster Wheeler recommends that where possible, disturbance of these materials should be minimized such as demolition by mechanical means.

In addition, as with all workers who may be exposed to hazardous materials, all demolition workers must undergo hazard specific awareness training. It is further recommended that all workers wear personal protective equipment such as appropriate respiratory equipment, dermal protection and disposable coveralls. All workers should also follow appropriate decontamination procedures prior to leaving the work area.

4.7 OTHER RECOMMENDATIONS

In the event of a demolition or other activities which may disturb the identified designated substances, it is recommended that all work be conducted in accordance with a Site specific demolition plan which should address such items as abatement, demolition methods, worker training and protection, decontamination procedures, dust suppression, and transportation and disposal of waste. It is expected that the demolition or other contractor will prepare such documents based on direction provided in project specification documents which are to be developed at a later date.

4.8 GENERAL WORKER PROTECTION

The presence of SVG has been identified at the Site. Amec Foster Wheeler does not anticipate the SVG observed at the time of the Site visit will pose a substantial concern to healthy workers entering the space. However the mould conditions are subject to change and should be monitored to determine if conditions may warrant worker protection measures. Workers should be notified of the mould issues present in the building.

While all other identified designated substances were in fair to good condition or otherwise had limited access (attic space), Amec Foster Wheeler recommends that any areas where designated substances are present which may pose a worker exposure issue, be isolated and the area restricted to knowledgeable workers with appropriate personal protection equipment. As indicated, the Site is vacant and minimum maintenance is expected. As such the Site conditions are subject to change.

5.0 SURVEY LIMITATIONS

Within the limitations of the agreed-upon scope of work, the field observations, measurements and analysis are considered sufficient to provide an overview of existing potential concerns or form a general inventory of hazardous materials in the subject area of the building. It should be noted that the data presented herein were collected at specific sampling locations, and depending on the homogeneity of the samples, the data may vary between these locations. Some inherent limitations exist as to the thoroughness of this assessment due to the nature of building construction. For example it may not practical to test all pipe insulation for asbestos content at the Site due to the amount and locations and being located under existing materials. Some reasonable extrapolation (e.g., sampling of similar materials) was required from the findings of the assessment.

Reasonable efforts were made to identify all substances designated in this report; however, Amec Foster Wheeler may not have been able to identify and assess all suspect designated substances, as certain building materials may exist that were not visible or accessible at the

time of the survey. Inaccessible locations include those that require demolition to gain entry, which present an unacceptable health or safety risk to the surveyors, and where entry is prohibited by security or other institutional restrictions. Areas above a suspended tile ceiling, crawlspaces, pipe chases and service tunnels, and areas behind an access hatch were considered accessible. Materials hidden by walls, finishes and equipment at the time of the survey were considered inaccessible.

The field observations, measurements and analysis are considered sufficient to form a general inventory of hazardous materials in the surveyed areas. It is possible that materials may exist which could not be reasonably identified within the scope of the assessment or which were not apparent or accessible during the Site visit. Within the limitations of the agreed-upon scope of work, the survey included building materials found within or forming part of the building envelope and building mechanical systems and equipment. The inspection did not include the identification of suspected hazardous materials located in the interior of electrical, mechanical (i.e. interior surfaces of ventilation ducting, boilers, etc.), or process manufacturing equipment, inside wall cavities (e.g., pipe chases), inaccessible ceiling plenums, sub floors, underlying materials (e.g., underlying flooring and paint layers), and where sampling could have affected the integrity of the system (e.g., water-proof roof membrane and caulking). Amec Foster Wheeler is not responsible for the repairs of building materials that were sampled during the survey.

This assessment has been undertaken and performed in a professional manner in accordance with generally accepted practices, using the degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. The findings of this report are based solely on the conditions of the Site encountered at the time of the Site visit on 22 January 2016, and are limited by the availability of information at the time of the survey. Due to physical limitations inherent to this work, Amec Foster Wheeler expressly does not warrant that the Site is free of designated substances or that all designated substances have been identified. It is possible that materials exist which could not be reasonably identified within the scope of the survey or which were not apparent or accessible during the site visit. No other warranties, expressed or implied, are made.

6.0 CLOSURE

This report was prepared for the exclusive use of Public Works and Government Services Canada and is intended to provide an overview of existing potential concerns within the specified work area at the time of the Site visit. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Amec Foster Wheeler is required. With respect to third parties, Amec Foster Wheeler has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

Amec Foster Wheeler has prepared this report for the express use of Public Works and Government Services Canada and may be relied upon by Public Works and Government Services Canada. No other person or organization is entitled to rely upon any part of this report without the prior written consent of Amec Foster Wheeler. Public Works and Government

Services Canada may release all or part(s) of this report to third parties; however, such third party in using this report agrees that it shall have no legal recourse against Amec Foster Wheeler or its subsidiaries, and shall indemnify and defend Amec Foster Wheeler or its subsidiaries from and against all claims arising out of or in conjunction with such use or reliance.

This report does not constitute legal advice. Amec Foster Wheeler makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel. In addition, Amec Foster Wheeler makes no determination or recommendation regarding the decision to purchase, sell or provide financing for this property.

This report presents an overview of issues of concern with the specified substances, reflecting Amec Foster Wheeler's best judgment using information reasonably available at the time of Amec Foster Wheeler's evaluation / survey. In preparing this report, Amec Foster Wheeler has relied upon certain information and representations provided by others. Amec Foster Wheeler did not attempt to independently verify the accuracy or completeness of that information. To the extent that the conclusions in this report are based in whole or in part on such information, those conclusions are contingent on its accuracy and validity. Amec Foster Wheeler assumes no responsibility for any consequence arising from any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to Amec Foster Wheeler.

This Report is subject to the contractual project agreement.

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

Respectfully,
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APPENDIX A
SURVEY DEFINITIONS AND METHODOLOGY

SURVEY DEFINITIONS, METHODOLOGY AND REGULATORY REQUIREMENTS

1.0 FIELD METHODOLOGY

The survey generally consisted of a room-by-room survey of all accessible areas within the buildings surveyed. The surveyor identified potential designated substances by appearance, age, and knowledge of current and historical uses of the Site and subject materials. Accessible locations are those for which entry is not prohibited by security or other institutional restrictions, that could be inspected without the need for destructive testing (e.g. penetration of a surface such as a wall, ceiling chase or shaft to gain access), and which did present an unacceptable health or safety risk to the surveyor. The area above a suspended tile ceiling, crawlspaces, pipe chases / service tunnels or behind an access hatch was generally considered to not be accessible. Materials hidden by walls, finishes and equipment at the time of the survey are considered inaccessible. Reasonable effort was used to identify potential designated substances in areas not readily accessible, such as confined areas enclosed by gypsum board, plaster, or panelling, etc., or where minor demolition was required to gain entry.

Intrusive sampling may have been conducted in the form of collecting samples of pipe insulation and other building materials, removing baseboards, lifting areas of carpet or flooring and cutting or breaking small holes in wallboard or plaster. Amec Foster Wheeler only performed such activities in areas where operation of the facility and the health and safety of occupants was affected. Effort was made to minimize or conceal damage. Amec Foster Wheeler was not responsible for the repair of any other areas sampled as part of this evaluation with the exception of temporary repairs to leave area in safe workplace condition.

While in the field, the surveyor completed a detailed checklist or collected detailed field notes for the building; a description of the rooms and a detailed description of any suspected designated substances observed within the rooms. Details of condition, visibility / accessibility, and any action that may be required to reduce asbestos fibre or other designated substances exposure hazards based on these observations were also recorded.

2.0 ASBESTOS-CONTAINING MATERIALS

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

The WSCC Asbestos Abatement Code of Practice states: “If asbestos-containing materials are identified and there is the potential for exposure, corrective action is required.” The Code of Practice also recommends considering the location, condition, function and cost prior to following the four basic approaches to controlling exposure: removal, encapsulation, enclosure and a management plan. The Code of Practice includes information on the techniques for the identification, safe abatement of asbestos-containing materials, and information on asbestos products, health hazards, worker protection, safe work procedures, inspection criteria, applicable

legislation and competency for those involved in abatement activities. This Code was adopted from the Alberta Asbestos Abatement Manual (2011).

In Northwest Territories, the *Occupational Health and Safety Regulations, Part 24* defines "asbestos" as a manufactured article or other material which contains 1% or more asbestos by weight either at the time of manufacture, or as determined by the following method:

- NIOSH Method 9002, as amended from time to time, from the NIOSH Manual of Analytical Methods, 4th Edition, published by the National Institute for Occupational Safety and Health, United States.

Friable material refers to an ACM that can be readily crumbled using hand pressure, separating asbestos fibres from the binding materials with which they are associated. Typical friable materials include acoustical or decorative spray applications, fireproofing, refractory and thermal insulation.

Non-friable material refers to an ACM that is associated with a binding agent (such as tar or cement) that prevents the ready release of airborne fibres. Typical non-friable materials include floor tiles, fire blankets, pre-formed manufactured cementitious insulation and wallboards, pipes, and siding. These materials are generally considered to pose a low hazard provided they remain intact and are not cut or shaped with power tools that are not equipped with a HEPA filtered dust collection system.

Amec Foster Wheeler collected samples of suspected ACMs and submitted them to EMC Labs Inc. (EMC) laboratory in Phoenix, Arizona and Amec Foster Wheeler's lab in Atlanta, Georgia for analysis. Both are National Voluntary Laboratory Accreditation Program (NVLAP) certified laboratories. The samples were analyzed using Polarized Light Microscopy (PLM) methods (EPA 600/R-93/116).

3.0 LEAD and LEAD CONTAINING PAINT

In building construction, lead was frequently used for roofs, cornices, tank linings, electrical conduits, and as a main component of soft solder ally used to seal pipe joints. Lead was also used extensively for pigmentation, sealing, and as a drying agent in oil based paints up until the early 1950's. Exterior paints typically contained up to 60% lead by weight.

In 1976, the Canadian Federal Government introduced the Liquid Coating Materials Regulations under the Federal Hazardous Products Act, restricting the maximum total lead content of paints and other liquid coating materials used in or around premises attended by children or pregnant women to 0.5% by weight (5000 mg/kg). In January 1991, Health Canada negotiated a voluntary reduction of lead content in all Canadian produced consumer paint to a maximum of 0.06%. Recently the Canadian Federal Government enacted the Surface Coating Materials Regulations which reduce the maximum total lead content of any new surface coatings for consumer products to 0.009% (90 mg/kg). This reduction does not generally apply to surface coating applied to buildings or other structures used for agricultural or industrial purposes or as an anti-weathering or anti-corrosive coating.

Northwest Territories Environmental Protection Act (EPA) considers a lead containing paint as any structural coating containing greater than 0.06% by weight (600 mg/kg). Surface coatings containing 600 mg/kg or 0.06% lead would be considered to represent a higher risk of exposure to

workers if disturbed during demolition activities. Removal or disturbance of paint coatings exceeding this concentration would require abatement or implementation of appropriate lead dust controls.

The Guideline for the General Management of Hazardous Waste describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste lead and lead paint debris. According to the Guideline for Industrial Waste Discharges in the NT, the maximum allowable lead content in leachate from solid waste including demolition debris is 5.0 milligrams per liter (mg/L). Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

In the preparation of this report, Amec Foster Wheeler consulted with Government of the Northwest Territories Environment Division who indicated that the current guidelines are under revision but are still to be followed. They further confirmed that any LCP (greater 600 mg/kg total or greater than 5.0 mg/kg TCLP) are not suitable for disposal at landfills in the Northwest Territories.

The survey included a description of typical building materials suspected to contain lead. Details of location, description, and condition were recorded. The survey included the collection of select bulk samples of readily accessible building materials suspected to contain a surface coating defined as a LCP. Paint chip samples were analyzed in accordance with U.S. EPA SW 846 3050 6010C for lead.

4.0 MERCURY

As part of the survey, Amec Foster Wheeler checked for such items as mercury containing thermostats, switches and lamps. Based on information provided by the U.S. Environmental Protection Agency (EPA), small commercial switches and thermostats may contain 2 to 18 mg of mercury with industrial switches and equipment containing 5 kg or more.

According to published literature including the Guide to Recycling Mercury-Containing lamps published by the Government of the Northwest Territories, older mercury containing lamps, the bulk of which are four foot T-12 fluorescent lamps, can contain up to 80 mg of mercury per lamp. Newer T-12, T-8 and T-5 style fluorescent lamps manufactured since 2000 have in the order of 3 to 12 mg of mercury per lamp. Other types of lamps, such as metal halide and high pressure sodium, can also contain mercury in the order of 20 to 250 mg/lamp.

The Canadian Council of Ministers of the Environment (CCME) *"Canada-Wide Standard for Mercury Containing Lamps"* (2001) is largely geared towards reducing the amount of mercury in lamps at the manufacturing stage; however they do recommend that the release of mercury can be minimized through the proper recycling and disposal of mercury containing lamps.

The Guideline for the General Management of Hazardous Waste describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste mercury. According to the Guideline for Industrial Waste Discharges in the NT, the maximum allowable mercury content in leachate from solid waste is 0.1 milligrams per liter (mg/L). The Guide to Recycling Mercury-Containing Lamps states that "*testing done in the NWT*

has confirmed that crushed mercury-containing lamps may not pass the leacheate test and therefore, are managed as hazardous waste". Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

5.0 POLYCHLORINATED BIPHENYL (PCB)

PCB-containing products were manufactured for use in applications where stable, fire-resistant, and heat-transfer properties were demanded between 1926-29 and 1977. Most PCBs were sold for use as dielectric fluids (insulating liquids) in electric transformers and capacitors. Other uses included heat transfer fluid, hydraulic fluid, dye carriers in carbonless copy paper, plasticizers in paints, adhesives, and caulking compounds. In Canada, PCBs were prohibited from being used in products, equipment, machinery, electrical transformers and capacitors that were manufactured or imported into the country after July 1980. However, older equipment in use after this date may still contain PCBs if the equipment's fluid has not been changed, or if there was sufficient inventory of such equipment.

As part of the survey, Amec Foster Wheeler assessed the Site for the presence of potential PCB-containing materials. Potential PCB-containing equipment or materials were identified by appearance, age and knowledge of current and historical uses of the Site and subject materials. The possible presence of PCBs in the fluorescent or other lamp ballasts was determined based on a visual assessment and the 1991 Environment Canada document entitled "*Identification of Lamp Ballasts Containing PCBs*." Light fixtures were characterized by type and a representative number of fixtures were examined in each functional area of the building, where accessible. Suspect electrical equipment including lighting ballasts was examined, where accessible.

There is a lack of clear Provincial / Territorial / Federal Regulatory framework to provide guidance on PCBs in building construction materials, particularly with respect to non-typical materials such as surface coatings and building materials. The regulations pertaining to PCBs are more related to liquids associated to electrical equipment and contaminated materials as opposed to PCBs in construction materials. The threshold for solid waste process residuals suitable for landfill as listed in the Guideline for Industrial Waste Discharges in the NWT is 50 mg/L by mass. Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

PCBs are also regulated under the Federal Canadian Environmental Protection Act, 1999, PCB Regulation SOR/2008-273 which came into force September 2008 and subsequent amendment regulation SOR 2010-57; (http://www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=105). The Federal PCB regulations generally establish deadlines for ending the use and long term storage of PCBs and products containing PCBs. PCB-containing equipment or any PCB-containing substance with a PCB concentration at or in excess of 2 ppm for liquids and 50 ppm for solids (which pertain to applied surface coatings such as paint) are subject to the above Federal regulations.

Select paint samples were submitted for PCB analysis. Paint samples analysed were determined based on general industry literature which indicated industrial paint coatings exhibiting elastomeric properties or durable paints may contain PCBs. Such coatings may be applied to or used as floor markings, exterior doors, railings and concrete surfaces. Paint

samples were randomly selected to get a general representation of the building surveyed. Paint samples were analysed by Amec Foster Wheeler's Edmonton Laboratory.

6.0 OZONE DEPLETING SUBSTANCES

As part of the survey, Amec Foster Wheeler checked for equipment or materials which may contain ODS such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons. Typically these ODSs may be used as refrigerants, propellants, in the manufacture of items such as packaging, insulation, solvents and halon based fire extinguishing agents.

In Canada, the production or import of CFCs were banned in January 1996. CFCs were developed in the 1930s for use as a substitute refrigerant to ammonia. While less damaging to the ozone layer, HCFCs are scheduled to be phased out in Canada between the years 2010 and 2020.

In Canada, the Federal and Provincial governments have legislation in place for ODSs. Federally, ODS is regulated under the Federal Halocarbon Regulations (SOR/2003-289 and amendment regulation SOR/2009-221; (http://ec.gc.ca/ozone/default.asp?lang=En&n=E06A6B0D-1) which are under the authority of the Federal Environmental Protection Act (1999). The purpose of the Federal Halocarbon Regulation is to regulate the use, identification, leak testing and disposal of ODSs on a Federally owned property.

7.0 MOULD

Mould spores are ubiquitous in both indoor and outdoor environments and in the presence of adequate moisture, may pose a concern in a building environment. Suspected mould growth on building materials was identified by visual growth (referred to as suspect visual mould growth; SVG) or evidence of water intrusion / damage. Based on the walk-through and observations Amec Foster Wheeler performed a walk-through visual inspection of the site for evidence of substantial moisture issues and mould reservoirs and/or amplifiers. The presence and extent of any SVG and water damage was determined using reasonable means noting that Amec Foster Wheeler may not have been able to identify all possible fungal reservoirs, as certain materials may be hidden by walls, finishes and equipment.

No samples of SVG were collected as part of the project scope of work.

There are currently no regulations specifically covering exposure to mould and/or mould remediation practices in Canada and there are no occupational exposure limits that define acceptable levels of mould exposure without adverse health effects. Direction on the assessment and remediation of mould in this report is based on the *"Mould Guidelines for the Canadian Construction Industry"* Canadian Construction Association (document CCA82). February 2004.

8.0 REGULATORY REQUIREMENTS

Sections 122.1 and 125.1 of the Canada Labour Code (R.S.C., 1985, c. L-2) and Part X of the Canada Occupational Health and Safety Regulations (SOR/86-304) address asbestos/hazardous substances in federally operated workplaces.

As per the Canada Labour Code:

- Section 122.1: “hazardous substance” includes a hazardous product and a chemical, biological or physical agent that, by reason of a property that the agent possesses, is hazardous to the safety or health of a person exposed to it.
- Section 125.1 Without restricting the generality of section 124 or limiting the duties of an employer under Section 125 but subject to any exceptions that may be prescribed, every employer shall, in respect of every work place controlled by the employer and, in respect of every work activity carried out by an employee in a workplace that is not controlled by the employer, to the extent that the employer controls the activity, (a) ensure that concentrations of hazardous substances in the work place are controlled in accordance with prescribed standards; (b) ensure that all hazardous substances in the work place are stored and handled in the manner prescribed; (c) ensure that all hazardous substances in the work place, other than hazardous products, are identified in the manner prescribed.
- Part X of the Canada Occupational Health and Safety Regulations Section 10.19 (1) states: “An employee shall be kept free from exposure to a concentration of […] (c) airborne chrysotile asbestos in excess of one fibre per cubic centimetre.”

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

Waste management and transfer of designated substances, is defined and outlined under the *Guideline for the General Management of Hazardous Waste in the NWT.*

APPENDIX B
SAMPLE SUMMARY TABLES

TABLE 1: SAMPLING INFORMATION SUMMARY – BULK ASBESTOS
Materials Determined to be Asbestos-Containing

Amec Foster Wheeler Sample No.	Lab ID No.	Photo No.	Sample Location Description	Sample Description	Laboratory Results	
					% Asbestos Fibres	Asbestos Type
ACM-02	246230	4	Dining room, under carpet	Vinyl Roll Flooring (VRF); beige/white	20	Chrysotile
				Mastic, tan	No Asbestos fibres detected	
ACM-06	246234	5	Side entrance, above exterior door	Gypsum Board	No Asbestos fibres detected	
				Gypsum Board Joint Compound (GBJC)	5	Chrysotile
ACM-07	246235	6	Lower level entrance	Gypsum Board	No Asbestos fibres detected	
				GBJC	5	Chrysotile
ACM-08	246236	-	Cupboard under stairs, lower level	Gypsum Board	No Asbestos fibres detected	
				GBJC	4	Chrysotile
ACM-10	246238	7	Master bedroom	Vinyl Floor Tile (VFT), beige/white 305 X 305 mm	5	Chrysotile
				Mastic, Tan	No Asbestos fibres detected	
ACM-12	246240	8	Bedroom	Gypsum Board	No Asbestos fibres detected	
				GBJC	5	Chrysotile
ACM-13	246241	9	Utility Room, upper level	Gypsum Board	No Asbestos fibres detected	
				GBJC	3	Chrysotile
ACM-14	246242	10	Master bedroom, closet	Gypsum Board	No Asbestos fibres detected	
				GBJC	5	Chrysotile
ACM-15	246243	11, 12	Attic	Vermiculite	-	Actinolite Present
ACM-16	246244	11, 12	Attic	Vermiculite	-	Actinolite Present
ACM-17	246245	11, 12	Attic	Vermiculite	-	Actinolite Present

TABLE 2: SAMPLING INFORMATION SUMMARY – BULK ASBESTOS
Materials Determined to be Non-Asbestos-Containing

Amec Foster Wheeler Sample No.	Lab ID No.	Photo No.	Sample Location Description	Sample Description	Laboratory Results	
					% Asbestos Fibres	Asbestos Type
ACM-01	246229	-	Kitchen	VRF, surface layer	No asbestos fibres detected	
ACM-03	246231	-	Dining Room	VFT- 228 X 228 mm; beige/white	No asbestos fibres detected	
				Mastic, tan	No asbestos fibres detected	
ACM-04	246232	-	Dining Room	Paper, below sub-floor	No asbestos fibres detected	
ACM-05	246233	23	Laundry room, surface VRF layer	VRF, beige/ white	No asbestos fibres detected	
				Mastic, tan	No asbestos fibres detected	
ACM-09	246237	24	Bedroom	VFT 228 X 228 mm , creamy brown	No asbestos fibres detected	
				Mastic, tan	No asbestos fibres detected	
ACM-11	246239	-	Master bedroom, below VFT	Paper, black	No asbestos fibres detected	
ACM-18	246246	-	Attic	Paper backing on insulation	No asbestos fibres detected	
ACM-19	246247	-	Exterior wall	Paper house wrap behind siding	No asbestos fibres detected	

TABLE 3: LEAD LABORATORY RESULTS, TCLP ANALYSIS RESULTS				
Sample Description and Location	**Laboratory Results Total Lead (mg/kg)**	**Photo No.**	**Amec Foster Wheeler Sample No.**	**Toxicity Characteristic Leaching Procedure (TCLP) mg/L**
White paint, exterior paint front deck - railing	<10	-	PB01 TCLP 38	0.022
Grey paint (and sub-layers) front deck - decking	**38,900**	-	PB02 TCLP 39	0.301
Beige paint, dining room	705	-	PB03 TCLP40	0.041
Beige paint – upper level landing	**875**	-	PB04	-

APPENDIX C
SITE PHOTOGRAPHS

Photo 1: View 15 Nanuk Place in Inuvik, NT (the "Site").

Photo 2: Living room, showing general state of building and repairs.

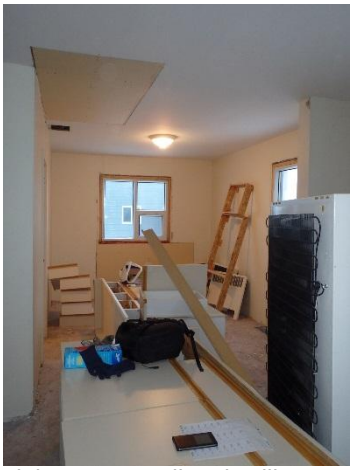

Photo 3: Dining room, wall and ceiling repairs visible**.**

Photo 4: Sample ACM-02, vinyl roll flooring (VRF), dining room (and lower level landing) was determined to **contain 20% Chrysotile asbestos fibres.**

Photo 5: Sample ACM-06, gypsum board joint compound (GBJC), side entrance above exterior door was determined to **contain 5% Chrysotile asbestos fibres.**

Photo 6: Sample ACM-07, GBJC – lower level entrance was determined to **contain 5% Chrysotile asbestos fibres.**

15 Nanuk Place, Inuvik, NT	Photo Date: 22 January 2016	Project No.: TV147020	Figure 1

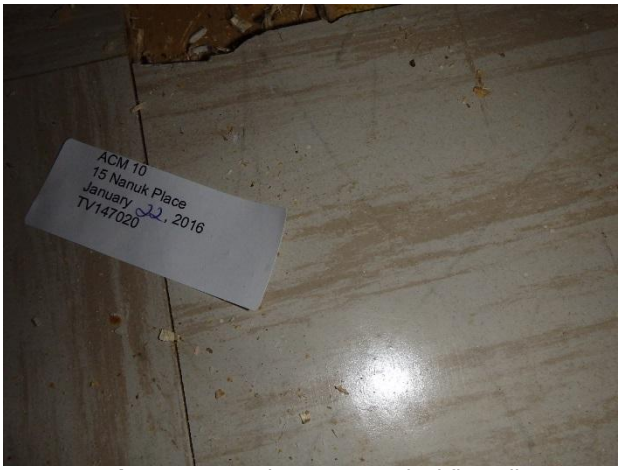

Photo 7: Sample ACM-10, vinyl floor tile 305 x 305 mm, master bedroom (and adjacent bedroom) was determined to **contain 5% Chrysotile asbestos fibres.**

Photo 8: Sample ACM-12, GBJC, upstairs bedroom was determined to **contain 5% Chrysotile asbestos fibres.**

Photo 9: Sample ACM-13, GBJC, upstairs utility room was determined to **contain 3% Chrysotile asbestos fibres.**

Photo 10: Sample ACM-14, GBJC, master bedroom closet was determined to **contain 5% Chrysotile asbestos fibres**.

Photo 11: Samples ACM- 15, 16 and 17, vermiculite, were determined to contain **Actinolite asbestos fibres**.

Photo 12: Vermiculite was observed to have been placed above (with traces below) pink fibreglass insulation.

15 Nanuk Place, Inuvik, NT	Photo Date: 22 January 2016	Project No.: TV147020	Figure 2

Photo 13: Sample PB02 - collected from the decking on the front deck, was determined to contain **38,900 mg/kg lead**.

Photo 14: Sample PB03, interior dining room wall paint was determined to contain **705 mg/kg lead**.

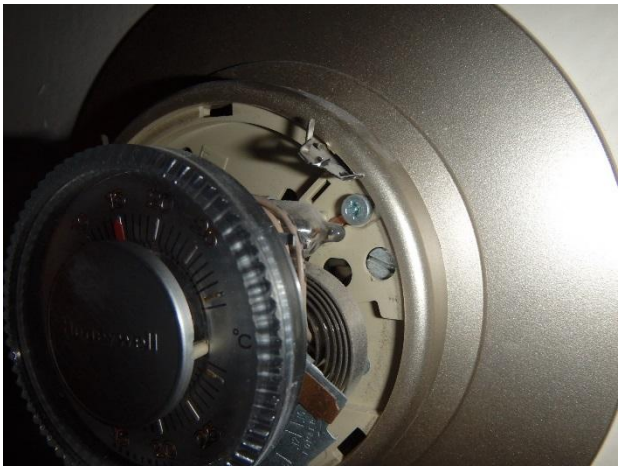

Photo 15: Mercury-containing thermostat observed on lower level.

Photo 16: Ballast labelled "No PCBs" observed in fixture on floor in kitchen.

Photo 17: Water damage and SVG observed in kitchen.

Photo 18: Water damage observed below bedroom windows on repaired sections of gypsum board**.**

15 Nanuk Place, Inuvik, NT	Photo Date: 22 January 2016	Project No.: TV147020	Figure 3

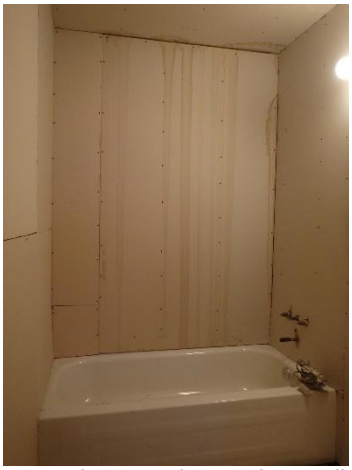

Photo 19: Water damage observed on walls and ceiling surrounding tub in bathroom.

Photo 20: Water intrusion observed on sub-floor along tub in bathroom.

Photo 21: Gypsum board replaced in several areas, including areas around windows.

Photo 22: SVG observed on underside of flooring in side entrance.

Photo 23: ACM-05, VRF, laundry room. No asbestos fibres detected.

Photo 24: ACM 09- VFT 228x228 mm, bedroom No asbestos fibres detected.

15 Nanuk Place, Inuvik, NT	Photo Date: 22 January 2016	Project No.: TV147020	Figure 4

Photo 25: One refrigerator observed on Site suspected to contain ODS.

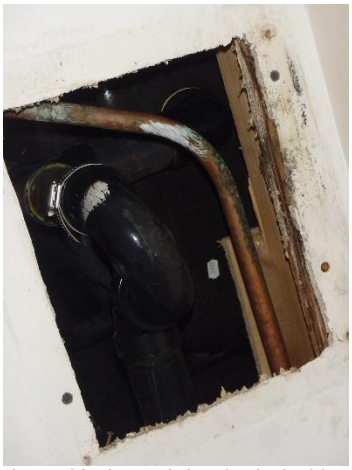

Photo 26: View of indoor piping included both PVC and copper.

Photo 27: Cast iron piping observed in crawl space.

Photo 28: Damaged exterior siding, paper wrap house wrap Sample ACM-19, no asbestos fibres detected.

15 Nanuk Place, Inuvik, NT	Photo Date: 22 January 2016	Project No.: TV147020	Figure 5

APPENDIX D
LABORATORY CERTIFICATES OF ANALYSES

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Inuvik Hazmat	AMEC Job No. :	TV147020
Project :	15 Nanuk	Report Date :	2/6/2016
Client Project No.:	N/A	Sample Date :	22-Jan-2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 2/ 6/2016, twenty-one (21) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246229	Linoleum kitchen ACM 01-15 Nanuk	None Detected-Sheet Flooring
246230	Linoleum dining room ACM 02-15 Nanuk	20% Chrysotile-Sheet Flooring None Detected-Tan Mastic
246231	9x9 tile dining room ACM 03-15 Nanuk	None Detected-Flooring None Detected-Tan Mastic
246232	Paper below subfloor dining room ACM 04-15 Nanuk	None Detected-Paper
246233	Linoleum laundry room ACM 05-15 Nanuk	None Detected-Sheet Flooring None Detected-Tan Mastic
246234	Drywall joint compound side entrance ACM 06-15 Nanuk	None Detected-Wallboard 5% Chrysotile-Joint Compound
246235	Drywall joint compound lower landing ACM 07-15 Nanuk	None Detected-Wallboard 5% Chrysotile-Joint Compound

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be the client's and recipients sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
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Client : Inuvik Hazmat
AMEC Job No. : TV147020
Project : 15 Nanuk
Report Date : 2/6/2016
Client Project No.: N/A
Sample Date : 22-Jan-2016
Identification : Asbestos, Bulk Sample Analysis
Test Method : Polarized Light Microscopy / Dispersion Staining (PLM/DS)
EPA 600/M4-82-020 / EPA Method 600/R-93/116

On 2/ 6/2016, twenty-one (21) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246236	Drywall joint compound cupboard under stairs at kitchen ACM 08-15 Nanuk	None Detected-Wallboard 4% Chrysotile-Joint Compound
246237	9x9 tile bedroom 2 ACM 09-15 Nanuk	None Detected-Flooring None Detected-Tan Mastic
246238	12x12 tile master bedroom ACM 10-15 Nanuk	5% Chrysotile-Floor Tile None Detected-Tan Mastic
246239	Paper below tile master bedroom ACM 11-15 Nanuk	None Detected-Paper
246240	Drywall joint compound bedroom 1 ACM 12-15 Nanuk	None Detected-Wallboard 5% Chrysotile-Joint Compound
246241	Drywall joint compound utility room ACM 13-15 Nanuk	None Detected-Wallboard 3% Chrysotile-Joint Compound
246242	Drywall joint compound master bedroom ACM 14-15 Nanuk	None Detected-Wallboard 5% Chrysotile-Joint Compound

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be the client's and recipients sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

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Client : Inuvik Hazmat
AMEC Job No. : TV147020
Project : 15 Nanuk
Report Date : 2/6/2016
Client Project No.: N/A
Sample Date : 22-Jan-2016
Identification : Asbestos, Bulk Sample Analysis
Test Method : Polarized Light Microscopy / Dispersion Staining (PLM/DS)
EPA 600/M4-82-020 / EPA Method 600/R-93/116

On 2/ 6/2016, twenty-one (21) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246243	Vermiculite attic ACM 15-15 Nanuk	-Actinolite Present
246244	Vermiculite attic ACM 16-15 Nanuk	-Actinolite Present
246245	Vermiculite attic ACM 17-15 Nanuk	-Actinolite Present
246246	Paper backing, fiberglass insulation attic ACM 18-15 Nanuk	None Detected-Paper
246247	Paper behind exterior vinyl siding Exterior ACM 19-15 Nanuk	None Detected-Paper
246248	Drywall Joint Compound DUP 1-15 Nanuk	Not Analyzed-Drywall Joint Compound
246249	Vermiculite DUP 3-15 Nanuk	Not Analyzed-Vermiculite

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Inuvik Hazmat	AMEC Job No. :	TV147020
Project :	15 Nanuk	Report Date :	2/6/2016
Client Project No.:	N/A	Sample Date :	22-Jan-2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

STATEMENT OF LABORATORY ACCREDITATION

These samples were analyzed at the Atlanta Branch of Amec Foster Wheeler Environment & Infrastructure, Inc. in the Asbestos Laboratory at 2677 Buford Hwy, Atlanta, GA, 30324. The laboratory holds accreditation from the National Institute of Standards and Technology (formerly National Bureau of Standards) under the National Voluntary Laboratory Accreditation Program (NVLAP). This laboratory also is licensed and authorized to perform as an Asbestos Laboratory in the State of Texas within the purview of Texas Occupations Code, chapter 1954, so long as this license is not suspended or revoked and is renewed according to the rules adopted by the Texas Board of Health.

The samples were analyzed by polarized light microscopy in general accordance with the procedures described in the Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116. The results of each bulk sample analysis relate only to the material tested. This report shall not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

Specific questions concerning bulk sample results shall be directed to the PLM Laboratory Manager.

Analyst : Tom D. Morrison

PLM Laboratory Manager : Tom D. Morrison

Approved Signatory : 

NVLAP
LAB CODE 101066-0

Final Analytical Report

Attention: Paul Houle

Amec Foster Wheeler Environment & Infrastructure
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Results for File: EC-70512

Project Number: TV147020
Project Name: Inuvik HazMat

Date Received: 2016/01/28
Date of Report: 2016/02/08

Report reviewed by:

Jesse Dang, B.Sc.
Manager
Laboratory Services

Kristine Connor
Director of QA/QC
Laboratory Services

** All samples will be disposed of after 30 days following analysis. Please contact the lab if you require additional sample storage time. (Samples deemed hazardous will be returned to the client at their own expense or disposal will be arranged.) **

Paint Analysis

Project No. TV147020

Final
File No. EC-70512

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1504 PB01 - 15 Nanuk 2016/01/22 13:30	16-1505 PB02 - 15 Nanuk 2016/01/22 13:45	16-1506 PB03 - 15 Nanuk 2016/01/22 14:00	16-1507 PB04 - 15 Nanuk 2016/01/22 14:20
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	< 10	38900	705	875
LL	2016/01/29	Lead	%	Calc	0.0010	< 0.0010	3.887	0.0706	0.0875

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1508 Dup2 - 15 Nanuk 2016/01/22 14:40	16-1509 TCLP38 - 15 Nanuk 2016/01/22 15:00	16-1510 TCLP39 - 15 Nanuk 2016/01/22 15:30	16-1511 TCLP40 - 15 Nanuk 2016/01/22 16:00
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	---	0.022	30.8	0.041
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	1170	---	---	---
LL	2016/01/29	Lead	%	Calc	0.0010	0.1167	---	---	---

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1512 TCLP41 - 15 Nanuk 2016/01/22 16:30
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	0.010

Quality Control Standard

Project No. TV147020 File No. EC-70512

Paint Analysis

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Analyzed Value	Advisory Range	Target Value	Reference No.
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.215	0.188-0.455	0.321	ERA D079-544
TY	2016/02/01	Lead	µg/g (ppm)	EPA 3050/6010	93	75-125	100	Metal-1

Analytical Comments

Project No. TV147020 File No. EC-70512

All Analytical results pertain to samples analyzed as received.

DL - Detection Limit

EPA: U.S. Environmental Protection Agency. 1997. Test Methods of Evaluation of Solid Waste 3rd Ed through Update III. Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

DESIGNATED SUBSTANCES SURVEY

Detached Three Bedroom Residence
18 Camsell Place
Inuvik, Northwest Territories

Submitted to:

Mr. Mike Molinski

Public Works Government Services Canada
100-167 Lombard Avenue
Winnipeg, Manitoba R3S 0T6

Submitted by:

Amec Foster Wheeler
Environment & Infrastructure
A Division of Amec Foster Wheeler Americas Limited
440 Dovercourt Drive
Winnipeg, Manitoba R3Y 1N4
204-488-2997

22 February 2016

Amec Foster Wheeler Project No. TV147020

EXECUTIVE SUMMARY

Public Works and Government Services Canada (PWGSC) retained Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler) conducted a designated substances survey (DSS) of a detached three bedroom residential building located at 18 Camsell Place, in Inuvik, Northwest Territories (the 'Site'). The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and the warehouse.

The purpose of the survey was to assess the building for the presence of specific hazardous substances; namely potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing equipment, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs) in light ballasts, silica, suspect visible mould growth (SVG) and toxic characteristic leaching procedure (TCLP) testing for lead.

At the time of the Site inspection, the property was developed as a two storey, wood frame residential building with an above ground crawlspace constructed on wood pilings. The building was vacant at the time of the Site visit and PWGSC reported that it was constructed in 1959. PWGSC also reported that subsequent to a major water damage event in 2010, electrical and mechanical services on Site were disconnected and that the building is to be demolished. Amec Foster Wheeler noted on Site that one light and two outlets were functional.).

Based on Amec Foster Wheeler's field assessment and laboratory results, identified ACMs included gypsum board joint compound observed throughout the building, vermiculite observed in the attic, and a cement pipe observed in the crawl space. Amec Foster Wheeler recommends that identified ACMs be removed using Moderate and High Risk asbestos abatement procedures.

Amec Foster Wheeler identified LCP surface coatings on Site as defined in this report. LCP was confirmed on interior wall paints throughout the building and in exterior paints. The two paint samples from the building exterior (exterior deck railings and exterior decking also having TCLP lead concentration exceeding the applicable regulatory value and thus considered hazardous waste for the purposes of disposal.

Amec Foster Wheeler observed one mercury containing thermostat in the building which would require removal and disposal prior to building demolition. Prior to demolition activities all mercury-containing equipment should be removed. It is considered good practice to recycle the lamps and recover the mercury where possible.

There was no equipment or other materials suspected of containing ODSs observed. All equipment suspected of containing ODSs should be inspected by a qualified technician prior to removal or disposal and if found to contain ODS, the unit must be decommissioned in accordance with federal and territorial regulations.

SVG was observed at several locations including ceiling below the exposed ceiling in the kitchen and covering approximately half the height of the wall in the bathroom behind the location of the former toilet. SVG is likely present at the Site in areas that could not be observed such as enclosed spaces and the growth could be extensive. Level III mould removal procedures would be required should the building be renovated. In the event of demolition, SVG removal is not anticipated.

Further discussion of the identified designated substances and recommendations are provided in the body of this report.

TABLE OF CONTENTS

EXECUTIVE SUMMARY ..... **I**

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE **1**

1.1 SCOPE OF WORK 1

2.0 DESCRIPTION OF SITE **1**

3.0 SURVEY RESULTS **2**

3.1 ASBESTOS-CONTAINING MATERIALS 2
3.2 LEAD AND LEAD-CONTAINING PAINT 3
3.3 MERCURY CONTAINING DEVICES 4
3.4 OZONE DEPLETING SUBSTANCES 4
3.5 POLYCHLORINATED BIPHENYLS 5
3.6 SUSPECT VISIBLE MOULD GROWTH AND WATER DAMAGE 5

4.0 RECOMMENDATIONS FOR FUTURE DEMOLITION **5**

4.1 ASBESTOS-CONTAINING MATERIALS 5
4.2 LEAD AND LEAD CONTAINING PAINT 6
4.3 MERCURY CONTAINING DEVICES 6
4.4 OZONE DEPLETING SUBSTANCE 7
4.5 POLYCHLORINATED BIPHENYLS 7
4.6 SUSPECT VISIBLE MOULD GROWTH AND WATER DAMAGE 7
4.7 OTHER RECOMMENDATIONS 7
4.8 GENERAL WORKER PROTECTION 8

5.0 SURVEY LIMITATIONS **8**

6.0 CLOSURE **9**

LIST OF APPENDICES

Appendix A Survey Definitions and Methodology
Appendix B Sampling Summary Tables
Appendix C Site Photographs
Appendix D Laboratory Certificates of Analyses

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler), was retained by Public Works and Government Services Canada (PWGSC) to conduct designated substances survey of a detached three bedroom residential building located at 18 Camsell Place, in Inuvik, NT (the 'Site'). The Site is a vacant two storey residential building with an above ground crawlspace constructed on wood pilings.

Amec Foster Wheeler understands that the purpose of the survey was to assess the structure for the presence of specific designated substances (DS) that may require special handling prior to renovation or demolition activities. Specific DS to be surveyed for included potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing devices, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs), and suspect visible mould growth (SVG). Amec Foster Wheeler understands that the building is scheduled for demolition and has included demolition requirements in the findings of the report as appropriate.

The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and warehouse.

1.1 SCOPE OF WORK

As stipulated in Amec Foster Wheeler's proposal dated 21 December 2015, the proposed scope of work was to include the following activities. The scope of work encompassed the completion of the following tasks for eight residential and two industrial buildings, each located in Inuvik, Northwest Territories.

- Conduct a DS survey of existing structure, including field and laboratory testing to confirm the presence/absence of materials of concern;
- Where reasonable within the context of the project budget and scope, provide quantities of DS associated with the building structure; and
- Prepare a DSS report for each individual structure.

Amec Foster Wheeler completed the above tasks for accessible areas within the subject building. A detailed summary of Amec Foster Wheeler's sampling methodology and definitions associated with the designated substances of concern are provided in Appendix A.

Amec Foster Wheeler completed the field assessment portion of the above scope of work on 23 January 2016. PWGSC did not provide Amec Foster Wheeler any reports on the building for review.

2.0 DESCRIPTION OF SITE

At the time of the Site inspection, the property was developed with a detached three bedroom residence. The building was of two storey construction with an above ground crawlspace constructed on wood pilings. The building was reported by PWGSC to have been constructed in

the 1959. PWGSC also reported that subsequent to a major water damage event in 2010, electrical services on Site were disconnected with the exception of two outlets on the lower level. It was also reported that heat was disconnected from the building after the water damage event. The building was observed to be in poor condition.

The general Site construction details were as follows:

Exterior Walls:	The exterior walls of the building were observed to be wood framing finished with vinyl clad siding.
Roof:	The roof was observed to be pitched, and finished with asphalt shingles. Observation of the roof was limited due to heavy snow cover. An attic space was present and observed through an access hatch. The attic space was insulated with vermiculite and fiberglass insulation.
Interior Walls:	Interior walls consisted of painted gypsum board.
Floor:	The flooring was observed to be primarily wood subfloor. Vinyl roll flooring (commonly referred to as linoleum) was observed in both entrances, the kitchen, laundry room and bathroom. Multiple layers of flooring were noted in some locations.
Interior Ceilings:	The ceilings consisted of gypsum board.
Lighting:	With the exception of two incandescent fixtures, the building was not illuminated.
Mechanical:	The building was not heated. The former heat source for the building was natural gas fired boiler.

Site photographs taken at the time of the site visit are provided in Appendix C.

3.0 SURVEY RESULTS

Ms. Karen Fortin and Mr. Mark Miller of Amec Foster Wheeler coordinated site inspection activities with Mr. Wally Ballas of PWGSC (Inuvik) who provided access and Site information for each of the structures.

Amec Foster Wheeler conducted a visual assessment of all accessible areas of the building as outlined in Appendix A: Survey Definitions and Methodology.

Photographs showing the Site condition and sample locations are provided in Appendix C.

3.1 ASBESTOS-CONTAINING MATERIALS

During the survey of the Site, Amec Foster Wheeler collected samples of suspect ACMs which were submitted to Amec Foster Wheeler's laboratory in Atlanta, Georgia for confirmatory laboratory analysis. A total of twenty-six samples (and two duplicate samples) of approximately 17 separate building materials were collected and submitted for analysis. The results of Amec Foster Wheeler's ACM sampling activities are summarized in Tables 1 and 2 of Appendix C, digital photographs of representative sampled materials are included in Appendix B, and the laboratory certificates of analysis are included in Appendix D.

ACMs identified include the following. All materials were generally observed in fair condition however the Site itself was observed to be in poor condition.

a) **Vermiculite insulation (friable)** – observed throughout the attic (fibreglass insulation was comingled with the vermiculite). Three separate samples were collected and found to contain Actinolite asbestos fibres based on samples ACM-19, ACM-20 and ACM-21.
b) **Gypsum board joint compound (friable)** – observed throughout the building was determined to contain between 5% - 10% Chrysotile asbestos fibres based on samples ACM-07, ACM-08, ACM-09, ACM-14, ACM-15 and ACM-18.
c) **Cement wastewater pipe (non-friable)** – observed in the crawl space, was determined to contain 30% Chrysotile and 5% Crocidolite asbestos fibres based on sample ACM-26. (Photo 2).

There were a number of other suspect ACMs present in the building that were sampled and, based on the laboratory analysis undertaken, are not considered to be ACMs including the following. These materials are listed in Table 1, Appendix B.

a) Vinyl roll flooring and associated mastic collected from the bathroom and kitchen (5 samples);
b) Vinyl floor tile from kitchen (two samples);
c) Other flooring material (tar paper – two samples);
d) Grout and mastic (one sample of each);
e) Insulation backing;
f) House wrap;
g) Roofing shingles (two samples); and
h) Roofing felt.

ACMs may be present in forms that were not observed or sampled during the Site inspection including, but not limited to, caulking, fire rated doors, thermal insulating materials such as gaskets associated with mechanical equipment, wiring and electrical components, packing associated with cast iron pipe joints, or in areas that were not accessible at the time of the survey.

For the purpose of renovation, demolition, or any other alteration or disturbance, all suspect ACMs, unless confirmed through sampling and analysis, should be considered to contain asbestos and handled in accordance with a written work plan that references current Territorial guidelines as presented in the *Northwest Territories & Nunavut Code of Practice on Asbestos Abatement"* (2012).

3.2 LEAD AND LEAD-CONTAINING PAINT

Based on the date of original building construction, there is a potential that LCP and other lead containing materials may have been used during construction of the original building or subsequent renovations. Amec Foster Wheeler submitted five samples of paint (samples PB-01 to PB-05) for laboratory analysis. At the discretion of the assessor, sampled items included representative interior walls and exterior decking. The paint on the interior trim was not sampled

during the assessment which was an unintentional omission. As explained in the report methodology, the sampling program considered typical paint coatings and not all surfaces were tested and mechanical equipment was not sampled. The samples were submitted to Amec Foster Wheeler's laboratory in Edmonton, Alberta for analysis of total lead content. The total lead concentration of the paint samples ranged from <12 mg/kg (parts per million; ppm) to 45,100 mg/kg (ppm). The highest total lead concentration was determined to be 45,100 mg/kg from the white exterior paint sample (PB04, Photo 5) recovered from the deck railings.

As discussed in the Methodology Section, surface coatings with a lead content greater than 0.06% by weight (600 mg/kg) considered to be LCPs for the purposes of this report. Laboratory results show that four of the five samples collected are considered to be LCP.

Amec Foster Wheeler submitted four of the above samples for further analysis using the toxicity characteristic leaching procedure (TCLP). According to the *Guideline for Industrial Waste Discharges* in the Northwest Territories, the maximum allowable lead content in leachate from demolition debris is 5.0 milligrams per liter (mg/L). Two TCLP samples collected by Amec Foster Wheeler were analyzed to contain more than 5.0 mg/L of leachable lead. TCLP 44 (front deck, white paint and sub-layers on railings) was 28.1 mg/L and TCLP 45 (front deck, grey paint and sub-layers from decking) was determined to contain 12.6 mg/L, both above the maximum allowable lead content for solid waste.

Results of the laboratory analyses are summarized in Table 3 (Appendix B), digital photographs of the sample locations are included in Appendix C, and the Laboratory's Certificates of Analyses are included in Appendix D.

Large sections of interior peeling painted surfaces were observed along the staircase, in the bathroom and in the bedroom closets, living room and dining room walls (Photos 7, 12, 13, & 16) and the upper section of bathroom walls and ceiling (Photo 18).

Based on the visual survey of the building, other products on-Site that may contain lead include copper plumbing fixture solders, plumbing fittings, cable coverings, and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials.

3.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler observed one mercury-containing thermostat in the living room (staircase wall, Photo 7). Other potential mercury containing equipment include switches and thermostats associated with the building mechanical systems, however Amec Foster Wheeler did not observe any such equipment at the Site.

3.4 OZONE DEPLETING SUBSTANCES

Amec Foster Wheeler did not observe any equipment suspected to contain ozone depleting substances on Site.

3.5 POLYCHLORINATED BIPHENYLS

No fluorescent light fixtures were observed on Site.

3.6 SUSPECT VISIBLE MOULD GROWTH AND WATER DAMAGE

Amec Foster Wheeler was informed by PWGSC that a significant water damage event that occurred in the residence in 2010, the result of a slow leak in the bathroom. It was reported that the water damage resulted in the removal of most of the building's electrical service. PWGSC also reported that heat to the building was disconnected around the same time the electrical supply was disconnected. At the time of the Site inspection, the temperature inside the building was approximately -25ºC. Extensive damage from both water and temperature extremes was observed throughout the Site. Frost was observed to cover most of the upper section of bathroom walls and ceiling (Photo 18).

Extensive water staining, water damage and SVG were observed at the Site. The areas affected included the window walls in both upper level bedrooms (Photos 14 & 15). SVG was also observed in the master bedroom closet (Photo 13).

SVG was observed to extend along the walls and ceiling below the exposed ceiling in the kitchen (Photos 10 & 11). SVG was also observed to cover approximately half the height of the wall in the bathroom behind the location of the former toilet (Photo 17). SVG is likely present at the Site in areas that could not be observed such as enclosed spaces and the growth could be extensive. Given apparent water intrusion issues at the Site, the extent of mould growth will likely increase with time unless measures are taken to improve or maintain the site conditions.

4.0 RECOMMENDATIONS FOR FUTURE DEMOLITION

The demolition recommendations for the materials identified in the building are provided below. It is assumed that all work will be completed on the vacant building in an area restricted to the public. All demolition activities shall be carried out in accordance with CSA standard S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures, the National Building Code Section 8 (Safety Measures at Construction and Demolition Sites) and other related sections.

All work shall be completed by qualified workers following written safe work procedures, in accordance with requirements of the *General Safety Regulation*, under the Northwest Territories *Safety Act*.

4.1 ASBESTOS-CONTAINING MATERIALS

Recommendations for the removal of ACMs identified in each of the proposed work areas are provided below. Completion of any of these recommendations must be performed by qualified asbestos workers or abatement contractors and in accordance with a written work plan prepared based on existing current Territorial regulations and/or guidelines.

a) **Cementitious pipe and coupler (non-friable, approximately 2 m length (152mm diameter) -** observed in the crawlspace, may be removed following Low Risk asbestos abatement procedures

b) **Gypsum board joint compound (friable, approximately 496 m^2) -** observed on walls and ceilings throughout the building. These materials may be removed following Moderate Risk asbestos abatement procedures.
c) **Vermiculite insulation (friable, approximately 55 m^2)** – observed throughout the attic may be removed following High Risk asbestos abatement procedures.

4.2 LEAD AND LEAD CONTAINING PAINT

Amec Foster Wheeler identified four LCP surface coatings which will be affected by building demolition activities. These are not suitable for disposal at a landfill in the Northwest Territories and a suitable disposal location will need to be identified.

Two of the four TCLP samples collected by Amec Foster Wheeler were above the maximum allowable lead leachate concentration for demolition debris. These are not suitable for disposal at a landfill in the Northwest Territories and will need to be considered as hazardous waste for disposal. It is anticipated that the LCP coated building materials would be disposed as one unit rather than the LCP removed, with the possible exception of where flaking was observed.

The paint on the interior trim was not sampled as part of the assessment. Additional sampling may be required unless the resulting waste is treated as LCP.
The remaining demolition debris is expected to be disposed of at most construction landfills without restrictions, however this should be confirmed with the landfill receiving the demolition waste prior to demolishing the building so that any requirements for special handling or disposal can be determined and suitable arrangement made.

Based on the visual survey of the building, other products on-Site that may contain lead include copper plumbing fixture solders, plumbing fittings, cable coverings, and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials.

All workers who may be exposed to lead must undergo hazard specific awareness training. All workers who may be performing activities that may create airborne lead dust, such as grinding, cutting, sandblasting or welding, should wear personal protective equipment including appropriate respiratory equipment, dermal protection and disposable coveralls. As lead containing paint poses a greater concern when heated, such as during welding operations, it is considered good practice to remove lead containing paint from surfaces to be welded or otherwise heated. Workers should also follow appropriate decontamination procedures prior to leaving the work area.

4.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler observed one mercury-containing thermostat on Site. The presence of mercury in thermostats poses minimal risks to occupants or workers provided the equipment is handled properly and the mercury is not allowed to escape. Prior to demolition activities all mercury-containing equipment must be removed.

4.4 OZONE DEPLETING SUBSTANCE

No equipment suspected of containing ozone depleting substances was observed on Site. Any suspect equipment discovered during demolition/renovation, should be inspected for the presence of ODSs and handled or disposed of in accordance with current Federal and Territorial regulations which shall be completed by trained and qualified technicians.

4.5 POLYCHLORINATED BIPHENYLS

No fluorescent light fixtures were observed on Site. It is considered good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed. If 'non-PCB' or 'No PCBs' labelling is not found on the ballasts, the ballasts should be compared to information obtained from the manufacture to determine PCB content. If the PCB content of the ballast cannot be determined, the ballast should be assumed to contain PCBs unless laboratory testing indicates otherwise. All PCB-containing ballasts, known or assumed, must be stored and transported in accordance with applicable Territorial and Federal hazardous waste and transportation of dangerous goods legislation

4.6 SUSPECT VISIBLE MOULD GROWTH AND WATER DAMAGE

Amec Foster Wheeler recommends that the Canadian Construction Association (CCA) guidelines be consulted with respect to the removal of water damaged materials or materials exhibiting SVG, and for additional recommendations regarding the management of moisture and prevention of mould growth in general construction. Given apparent water intrusion issues at the Site, the extent of mould growth will likely increase with time unless measures are taken to improve or maintain the site conditions.

As the building is to be demolished, Amec Foster Wheeler does not recommend removal of these materials prior to demolition. However, as workers will be required to enter this area for the purposes of asbestos-abatement and other demolition activities, workers should be informed of the hazards associated with mould and provided with personal protective equipment appropriate to the specific task. In order to minimize worker exposure, Amec Foster Wheeler recommends that where possible, disturbance of these materials should be minimized such as demolition by mechanical means.

In addition, as with all workers who may be exposed to hazardous materials, all demolition workers must undergo hazard specific awareness training. It is further recommended that all workers wear personal protective equipment such as appropriate respiratory equipment, dermal protection and disposable coveralls. All workers should also follow appropriate decontamination procedures prior to leaving the work area.

4.7 OTHER RECOMMENDATIONS

It is recommended that all work be conducted in accordance with a Site specific demolition plan which should address such items as abatement, demolition methods, worker training and protection, decontamination procedures, dust suppression, and transportation and disposal of waste. It is expected that the demolition contractor will prepare such documents based on direction provided in project specification documents which are to be developed at a later date.

4.8 GENERAL WORKER PROTECTION

The presence of SVG and pealing lead paint has been identified at the Site. Amec Foster Wheeler recommends that any areas where designated substances are present which may pose a worker exposure issue, be isolated and the area restricted to knowledgeable workers with appropriate personal protection equipment. As indicated, the Site is vacant and minimum maintenance is expected. As such the Site conditions are subject to change.

Workers entering the building or working at the facility should be aware of potential hazards. Any workers who may be exposed to hazardous materials shall wear appropriate personal protective equipment such as respiratory protection, dermal protection and disposable coveralls while working in close proximity to the damaged or hazard areas. All workers should also follow appropriate decontamination procedures prior to leaving the work area.

5.0 SURVEY LIMITATIONS

Within the limitations of the agreed-upon scope of work, the field observations, measurements and analysis are considered sufficient to provide an overview of existing potential concerns or form a general inventory of hazardous materials in the subject area of the building. It should be noted that the data presented herein were collected at specific sampling locations, and depending on the homogeneity of the samples, the data may vary between these locations. Some inherent limitations exist as to the thoroughness of this assessment due to the nature of building construction. For example it may not practical to test all pipe insulation for asbestos content at the Site due to the amount and locations and being located under existing materials. Some reasonable extrapolation (e.g., sampling of similar materials) was required from the findings of the assessment.

Reasonable efforts were made to identify all substances designated in this report; however, Amec Foster Wheeler may not have been able to identify and assess all suspect designated substances, as certain building materials may exist that were not visible or accessible at the time of the survey. Inaccessible locations include those that require demolition to gain entry, which present an unacceptable health or safety risk to the surveyors, and where entry is prohibited by security or other institutional restrictions. Areas above a suspended tile ceiling, crawl spaces, pipe chases and service tunnels, and areas behind an access hatch were considered accessible. Materials hidden by walls, finishes and equipment at the time of the survey were considered inaccessible.

The field observations, measurements and analysis are considered sufficient to form a general inventory of hazardous materials in the surveyed areas. It is possible that materials may exist which could not be reasonably identified within the scope of the assessment or which were not apparent or accessible during the Site visit. Within the limitations of the agreed-upon scope of work, the survey included building materials found within or forming part of the building envelope and building mechanical systems and equipment. The inspection did not include the identification of suspected hazardous materials located in the interior of electrical, mechanical (i.e. interior surfaces of ventilation ducting, boilers, etc.), or process manufacturing equipment, inside wall cavities (e.g., pipe chases), inaccessible ceiling plenums, sub floors, underlying materials (e.g., underlying flooring and paint layers), and where sampling could have affected the integrity of the

system (e.g., water-proof roof membrane and caulking). Amec Foster Wheeler is not responsible for the repairs of building materials that were sampled during the survey.

This assessment has been undertaken and performed in a professional manner in accordance with generally accepted practices, using the degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. The findings of this report are based solely on the conditions of the Site encountered at the time of the Site visit on 23 January 2016, and are limited by the availability of information at the time of the survey. Due to physical limitations inherent to this work, Amec Foster Wheeler expressly does not warrant that the Site is free of designated substances or that all designated substances have been identified. It is possible that materials exist which could not be reasonably identified within the scope of the survey or which were not apparent or accessible during the site visit. No other warranties, expressed or implied, are made.

6.0 CLOSURE

This report was prepared for the exclusive use of Public Works and Government Services Canada and is intended to provide an overview of existing potential concerns within the specified work area at the time of the Site visit. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Amec Foster Wheeler is required. With respect to third parties, Amec Foster Wheeler has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

Amec Foster Wheeler has prepared this report for the express use of Public Works and Government Services Canada and may be relied upon by Public Works and Government Services Canada. No other person or organization is entitled to rely upon any part of this report without the prior written consent of Amec Foster Wheeler. Public Works and Government Services Canada may release all or part(s) of this report to third parties; however, such third party in using this report agrees that it shall have no legal recourse against Amec Foster Wheeler or its subsidiaries, and shall indemnify and defend Amec Foster Wheeler or its subsidiaries from and against all claims arising out of or in conjunction with such use or reliance.

This report does not constitute legal advice. Amec Foster Wheeler makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel. In addition, Amec Foster Wheeler makes no determination or recommendation regarding the decision to purchase, sell or provide financing for this property.

This report presents an overview of issues of concern with the specified substances, reflecting Amec Foster Wheeler's best judgment using information reasonably available at the time of Amec Foster Wheeler's evaluation / survey. In preparing this report, Amec Foster Wheeler has relied

upon certain information and representations provided by others. Amec Foster Wheeler did not attempt to independently verify the accuracy or completeness of that information. To the extent that the conclusions in this report are based in whole or in part on such information, those conclusions are contingent on its accuracy and validity. Amec Foster Wheeler assumes no responsibility for any consequence arising from any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to Amec Foster Wheeler.

This Report is subject to the contractual project agreement.

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

Respectfully,
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APPENDIX A
SURVEY DEFINITIONS AND METHODOLOGY

SURVEY DEFINITIONS, METHODOLOGY AND REGULATORY REQUIREMENTS

1.0 FIELD METHODOLOGY

The survey generally consisted of a room-by-room survey of all accessible areas within the buildings surveyed. The surveyor identified potential designated substances by appearance, age, and knowledge of current and historical uses of the Site and subject materials. Accessible locations are those for which entry is not prohibited by security or other institutional restrictions, that could be inspected without the need for destructive testing (e.g. penetration of a surface such as a wall, ceiling chase or shaft to gain access), and which did present an unacceptable health or safety risk to the surveyor. The area above a suspended tile ceiling, crawl spaces, pipe chases / service tunnels or behind an access hatch was generally considered to not be accessible. Materials hidden by walls, finishes and equipment at the time of the survey are considered inaccessible. Reasonable effort was used to identify potential designated substances in areas not readily accessible, such as confined areas enclosed by gypsum board, plaster, or panelling, etc., or where minor demolition was required to gain entry.

Intrusive sampling may have been conducted in the form of collecting samples of pipe insulation and other building materials, removing baseboards, lifting areas of carpet or flooring and cutting or breaking small holes in wallboard or plaster. Amec Foster Wheeler only performed such activities in areas where operation of the facility and the health and safety of occupants was affected. Effort was made to minimize or conceal damage. Amec Foster Wheeler was not responsible for the repair of any other areas sampled as part of this evaluation with the exception of temporary repairs to leave area in safe workplace condition.

While in the field, the surveyor completed a detailed checklist or collected detailed field notes for the building; a description of the rooms and a detailed description of any suspected designated substances observed within the rooms. Details of condition, visibility / accessibility, and any action that may be required to reduce asbestos fibre or other designated substances exposure hazards based on these observations were also recorded.

2.0 ASBESTOS-CONTAINING MATERIALS

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

The WSCC Asbestos Abatement Code of Practice states: “If asbestos-containing materials are identified and there is the potential for exposure, corrective action is required.” The Code of Practice also recommends considering the location, condition, function and cost prior to following the four basic approaches to controlling exposure: removal, encapsulation, enclosure and a management plan. The Code of Practice includes information on the techniques for the identification, safe abatement of asbestos-containing materials, and information on asbestos products, health hazards, worker protection, safe work procedures, inspection criteria, applicable

legislation and competency for those involved in abatement activities. This Code was adopted from the Alberta Asbestos Abatement Manual (2011).

In Northwest Territories, the *Occupational Health and Safety Regulations, Part 24* defines "asbestos" as a manufactured article or other material which contains 1% or more asbestos by weight either at the time of manufacture, or as determined by the following method:

- NIOSH Method 9002, as amended from time to time, from the NIOSH Manual of Analytical Methods, 4th Edition, published by the National Institute for Occupational Safety and Health, United States.

Friable material refers to an ACM that can be readily crumbled using hand pressure, separating asbestos fibres from the binding materials with which they are associated. Typical friable materials include acoustical or decorative spray applications, fireproofing, refractory and thermal insulation.

Non-friable material refers to an ACM that is associated with a binding agent (such as tar or cement) that prevents the ready release of airborne fibres. Typical non-friable materials include floor tiles, fire blankets, pre-formed manufactured cementitious insulation and wallboards, pipes, and siding. These materials are generally considered to pose a low hazard provided they remain intact and are not cut or shaped with power tools that are not equipped with a HEPA filtered dust collection system.

Amec Foster Wheeler collected samples of suspected ACMs and submitted them to EMC Labs Inc. (EMC) laboratory in Phoenix, Arizona and Amec Foster Wheeler's lab in Atlanta, Georgia for analysis. Both are National Voluntary Laboratory Accreditation Program (NVLAP) certified laboratories. The samples were analyzed using Polarized Light Microscopy (PLM) methods (EPA 600/R-93/116).

3.0 LEAD and LEAD CONTAINING PAINT

In building construction, lead was frequently used for roofs, cornices, tank linings, electrical conduits, and as a main component of soft solder ally used to seal pipe joints. Lead was also used extensively for pigmentation, sealing, and as a drying agent in oil based paints up until the early 1950's. Exterior paints typically contained up to 60% lead by weight.

In 1976, the Canadian Federal Government introduced the Liquid Coating Materials Regulations under the Federal Hazardous Products Act, restricting the maximum total lead content of paints and other liquid coating materials used in or around premises attended by children or pregnant women to 0.5% by weight (5000 mg/kg). In January 1991, Health Canada negotiated a voluntary reduction of lead content in all Canadian produced consumer paint to a maximum of 0.06%. Recently the Canadian Federal Government enacted the Surface Coating Materials Regulations which reduce the maximum total lead content of any new surface coatings for consumer products to 0.009% (90 mg/kg). This reduction does not generally apply to surface coating applied to buildings or other structures used for agricultural or industrial purposes or as an anti-weathering or anti-corrosive coating.

Northwest Territories Environmental Protection Act (EPA) considers a lead containing paint as any structural coating containing greater than 0.06% by weight (600 mg/kg). Surface coatings containing 600 mg/kg or 0.06% lead would be considered to represent a higher risk of exposure to

workers if disturbed during demolition activities. Removal or disturbance of paint coatings exceeding this concentration would require abatement or implementation of appropriate lead dust controls.

The Guideline for the General Management of Hazardous Waste describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste lead and lead paint debris. According to the Guideline for Industrial Waste Discharges in the NT, the maximum allowable lead content in leachate from solid waste including demolition debris is 5.0 milligrams per liter (mg/L). Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

In the preparation of this report, Amec Foster Wheeler consulted with Government of the Northwest Territories Environment Division who indicated that the current guidelines are under revision but are still to be followed. They further confirmed that any LCP (greater 600 mg/kg total or greater than 5.0 mg/kg TCLP) are not suitable for disposal at landfills in the Northwest Territories.

The survey included a description of typical building materials suspected to contain lead. Details of location, description, and condition were recorded. The survey included the collection of select bulk samples of readily accessible building materials suspected to contain a surface coating defined as a LCP. Paint chip samples were analyzed in accordance with U.S. EPA SW 846 3050 6010C for lead.

4.0 MERCURY

As part of the survey, Amec Foster Wheeler checked for such items as mercury containing thermostats, switches and lamps. Based on information provided by the U.S. Environmental Protection Agency (EPA), small commercial switches and thermostats may contain 2 to 18 mg of mercury with industrial switches and equipment containing 5 kg or more.

According to published literature including the Guide to Recycling Mercury-Containing lamps published by the Government of the Northwest Territories, older mercury containing lamps, the bulk of which are four foot T-12 fluorescent lamps, can contain up to 80 mg of mercury per lamp. Newer T-12, T-8 and T-5 style fluorescent lamps manufactured since 2000 have in the order of 3 to 12 mg of mercury per lamp. Other types of lamps, such as metal halide and high pressure sodium, can also contain mercury in the order of 20 to 250 mg/lamp.

The Canadian Council of Ministers of the Environment (CCME) *"Canada-Wide Standard for Mercury Containing Lamps"* (2001) is largely geared towards reducing the amount of mercury in lamps at the manufacturing stage; however they do recommend that the release of mercury can be minimized through the proper recycling and disposal of mercury containing lamps.

The Guideline for the General Management of Hazardous Waste describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste mercury. According to the Guideline for Industrial Waste Discharges in the NT, the maximum allowable mercury content in leachate from solid waste is 0.1 milligrams per liter (mg/L). The Guide to Recycling Mercury-Containing Lamps states that "*testing done in the NWT*

has confirmed that crushed mercury-containing lamps may not pass the leacheate test and therefore, are managed as hazardous waste". Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

5.0 POLYCHLORINATED BIPHENYL (PCB)

PCB-containing products were manufactured for use in applications where stable, fire-resistant, and heat-transfer properties were demanded between 1926-29 and 1977. Most PCBs were sold for use as dielectric fluids (insulating liquids) in electric transformers and capacitors. Other uses included heat transfer fluid, hydraulic fluid, dye carriers in carbonless copy paper, plasticizers in paints, adhesives, and caulking compounds. In Canada, PCBs were prohibited from being used in products, equipment, machinery, electrical transformers and capacitors that were manufactured or imported into the country after July 1980. However, older equipment in use after this date may still contain PCBs if the equipment's fluid has not been changed, or if there was sufficient inventory of such equipment.

As part of the survey, Amec Foster Wheeler assessed the Site for the presence of potential PCB-containing materials. Potential PCB-containing equipment or materials were identified by appearance, age and knowledge of current and historical uses of the Site and subject materials. The possible presence of PCBs in the fluorescent or other lamp ballasts was determined based on a visual assessment and the 1991 Environment Canada document entitled "*Identification of Lamp Ballasts Containing PCBs*." Light fixtures were characterized by type and a representative number of fixtures were examined in each functional area of the building, where accessible. Suspect electrical equipment including lighting ballasts was examined, where accessible.

There is a lack of clear Provincial / Territorial / Federal Regulatory framework to provide guidance on PCBs in building construction materials, particularly with respect to non-typical materials such as surface coatings and building materials. The regulations pertaining to PCBs are more related to liquids associated to electrical equipment and contaminated materials as opposed to PCBs in construction materials. The threshold for solid waste process residuals suitable for landfill as listed in the Guideline for Industrial Waste Discharges in the NWT is 50 mg/L by mass. Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

PCBs are also regulated under the Federal Canadian Environmental Protection Act, 1999, PCB Regulation SOR/2008-273 which came into force September 2008 and subsequent amendment regulation SOR 2010-57; (http://www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=105). The Federal PCB regulations generally establish deadlines for ending the use and long term storage of PCBs and products containing PCBs. PCB-containing equipment or any PCB-containing substance with a PCB concentration at or in excess of 2 ppm for liquids and 50 ppm for solids (which pertain to applied surface coatings such as paint) are subject to the above Federal regulations.

Select paint samples were submitted for PCB analysis. Paint samples analysed were determined based on general industry literature which indicated industrial paint coatings exhibiting elastomeric properties or durable paints may contain PCBs. Such coatings may be applied to or used as floor markings, exterior doors, railings and concrete surfaces. Paint

samples were randomly selected to get a general representation of the building surveyed. Paint samples were analysed by Amec Foster Wheeler's Edmonton Laboratory.

6.0 OZONE DEPLETING SUBSTANCES

As part of the survey, Amec Foster Wheeler checked for equipment or materials which may contain ODS such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons. Typically these ODSs may be used as refrigerants, propellants, in the manufacture of items such as packaging, insulation, solvents and halon based fire extinguishing agents.

In Canada, the production or import of CFCs were banned in January 1996. CFCs were developed in the 1930s for use as a substitute refrigerant to ammonia. While less damaging to the ozone layer, HCFCs are scheduled to be phased out in Canada between the years 2010 and 2020.

In Canada, the Federal and Provincial governments have legislation in place for ODSs. Federally, ODS is regulated under the Federal Halocarbon Regulations (SOR/2003-289 and amendment regulation SOR/2009-221; (http://ec.gc.ca/ozone/default.asp?lang=En&n=E06A6B0D-1) which are under the authority of the Federal Environmental Protection Act (1999). The purpose of the Federal Halocarbon Regulation is to regulate the use, identification, leak testing and disposal of ODSs on a Federally owned property.

7.0 MOULD

Mould spores are ubiquitous in both indoor and outdoor environments and in the presence of adequate moisture, may pose a concern in a building environment. Suspected mould growth on building materials was identified by visual growth (referred to as suspect visual mould growth; SVG) or evidence of water intrusion / damage. Based on the walk-through and observations Amec Foster Wheeler performed a walk-through visual inspection of the site for evidence of substantial moisture issues and mould reservoirs and/or amplifiers. The presence and extent of any SVG and water damage was determined using reasonable means noting that Amec Foster Wheeler may not have been able to identify all possible fungal reservoirs, as certain materials may be hidden by walls, finishes and equipment.

No samples of SVG were collected as part of the project scope of work.

There are currently no regulations specifically covering exposure to mould and/or mould remediation practices in Canada and there are no occupational exposure limits that define acceptable levels of mould exposure without adverse health effects. Direction on the assessment and remediation of mould in this report is based on the *"Mould Guidelines for the Canadian Construction Industry"* Canadian Construction Association (document CCA82). February 2004.

8.0 REGULATORY REQUIREMENTS

Sections 122.1 and 125.1 of the Canada Labour Code (R.S.C., 1985, c. L-2) and Part X of the Canada Occupational Health and Safety Regulations (SOR/86-304) address asbestos/hazardous substances in federally operated workplaces.

As per the Canada Labour Code:

- Section 122.1: “hazardous substance” includes a hazardous product and a chemical, biological or physical agent that, by reason of a property that the agent possesses, is hazardous to the safety or health of a person exposed to it.
- Section 125.1 Without restricting the generality of section 124 or limiting the duties of an employer under Section 125 but subject to any exceptions that may be prescribed, every employer shall, in respect of every work place controlled by the employer and, in respect of every work activity carried out by an employee in a workplace that is not controlled by the employer, to the extent that the employer controls the activity, (a) ensure that concentrations of hazardous substances in the work place are controlled in accordance with prescribed standards; (b) ensure that all hazardous substances in the work place are stored and handled in the manner prescribed; (c) ensure that all hazardous substances in the work place, other than hazardous products, are identified in the manner prescribed.
- Part X of the Canada Occupational Health and Safety Regulations Section 10.19 (1) states: “An employee shall be kept free from exposure to a concentration of […] (c) airborne chrysotile asbestos in excess of one fibre per cubic centimetre.”

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

Waste management and transfer of designated substances, is defined and outlined under the *Guideline for the General Management of Hazardous Waste in the NWT.*

APPENDIX B
SAMPLE SUMMARY TABLES

TABLE 1: SAMPLING INFORMATION SUMMARY – BULK ASBESTOS
Materials Determined to be Asbestos-Containing

Amec Foster Wheeler Sample No.	Lab ID No.	Photo No.	Sample Location Description	Sample Description	Laboratory Results	
					% Asbestos Fibres	Asbestos Type
ACM-07	246099		Living room, staircase wall	Gypsum board joint compound (GBJC)	10	Chrysotile
ACM-08	246100		Laundry room, interior wall	GBJC	10	Chrysotile
ACM-09	246101		Lower level bedroom, exterior wall	GBJC	5	Chrysotile
ACM-14	246106		Master bedroom, at sloped ceiling	GBJC	10	Chrysotile
ACM-15	246107		Upper level, smaller bedroom, at sloped ceiling	GBJC	5	Chrysotile
ACM-18	246110		Bathroom, tub wall above tiles	GBJC	5	Chrysotile
ACM-19	246111		Attic	Vermiculite	Present*	Actinolite
ACM-20	246112		Attic	Vermiculite	Present*	Actinolite
ACM-21	246113		Attic	Vermiculite	Present*	Actinolite
ACM-26	246118		Crawl space, waste water pipe	Cement pipe	30	Chrysotile
					5	Crocidolite
Dup 1	246119		Replicate of AMC- 09	GBJC	7	Chrysotile
Dup 2	246120		Replicate of ACM-18	GBJC	5	Chrysotile

TABLE 2: SAMPLING INFORMATION SUMMARY – BULK ASBESTOS
Materials Determined to be Non-Asbestos-Containing

Amec Foster Wheeler Sample No.	Lab ID No.	Photo No.	Sample Location Description	Sample Description	Laboratory Results	
					% Asbestos Fibres	Asbestos Type
ACM-01	246093		Kitchen, flooring at surface	Vinyl roll flooring (VRF)	No asbestos fibres detected	
ACM-02	246094		Kitchen, flooring, 2nd layer from surface	VRF	No asbestos fibres detected	
ACM-03	246095		Kitchen, flooring below subfloor	VRF	No asbestos fibres detected	
ACM-04	246096		Kitchen, flooring below 2nd subfloor	208 X 208 mm vinyl floor tile	No asbestos fibres detected	
				Backing	No asbestos fibres detected	
				Mastic, tan	No asbestos fibres detected	
ACM-05	246097		Kitchen flooring, below 3rd subfloor	Tar paper	No asbestos fibres detected	
ACM-06	246098		Dining room, exposed ceiling cavity	Paper backing, fiberglass insulation	No asbestos fibres detected	
ACM-10	246102		Master bedroom, tar paper below subfloor	Paper	No asbestos fibres detected	
ACM-11	246103		Master bedroom, additional layer of tar paper below ACM-10	Paper	No asbestos fibres detected	
ACM-12	246104		Bathroom, 2nd layer	VRF	No asbestos fibres detected	
				Mastic, tan	No asbestos fibres detected	
ACM-13	246105		Bathroom, below sub floor	VRF	No asbestos fibres detected	
				Mastic, tan	No asbestos fibres detected	
ACM-16	246108		Bathroom, wall tile	Grout	No asbestos fibres detected	
ACM-17	246109		Bathroom, wall tile	Mastic, tan	No asbestos fibres detected	
ACM-22	246114		Attic, fibreglass insulation	Paper backing	No asbestos fibres detected	
ACM-23	246115		Roof, shingle, surface layer	Shingle	No asbestos fibres detected	
ACM-24	246116		Roof, shingle 2nd layer	Shingle	No asbestos fibres detected	
ACM-25	246117		Roof, roofing felt below ACM-24	Paper	No asbestos fibres detected	

TABLE 3: LEAD LABORATORY RESULTS, TCLP ANALYSIS RESULTS				
Sample Description and Location	**Laboratory Results Total Lead (mg/kg)**	**Photo No.**	**Amec Foster Wheeler Sample No.**	**Toxicity Characteristic Leaching Procedure (TCLP) mg/L**
Beige paint – living room wall	**1, 150**	-	PB01 TCLP 42	0.009
Beige paint – staircase	12	-	PB02	
Beige paint – master bedroom wall	**2, 090**	4	PB03 TCLP 43	0.020
White, brown, salmon, grey paint – exterior deck railings, trim	**45,100**	5	PCB04 TCLP 44	**28.1**
Grey, brown, salmon paint – exterior deck (decking)	**5, 510**	6	PCB05 TCLP 45	**12.6**

APPENDIX C
SITE PHOTOGRAPHS

Photo 1: View of 18 Camsell Place in Inuvik, NT - the "Site"

Photo 2: Sample ACM-26, crawl space, coupler connecting 152 mm dia. cast iron and cementitious waste-water pipes was determined to contain **30% Chrysotile and 5% Crocidolite asbestos fibres.**

Photo 3: Sample PB01, living room wall paint was determined to **contain 1,150 mg/kg lead.**

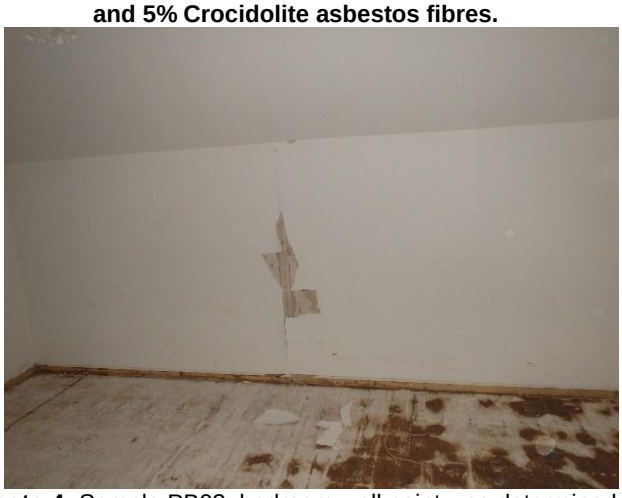

Photo 4: Sample PB03, bedroom wall paint was determined to **contain 2,090 mg/kg lead.**

Photo 5: Sample PB04, exterior paint on deck railings was determined **contain 45,100 mg/kg lead.**

Photo 6: Sample PB05, exterior paint on deck decking was determined to **contain 5,510 mg/kg lead.**

18 Camsell Place, Inuvik, NT	Photo Date: 23 January 2016	Project No.: TV147020	Figure 1

Photo 7: View of living room/dining room wall and ceiling**.** Site has had no heat and minimal electrical supply since water damage event in 2010.

Photo 8: Most floors in building were observed to be have been stripped to the subfloor**.**

Photo 9: View of kitchen ceiling. Water damage in the building was a result of a leaking toilet on the second level.

Photo 10: View of surface visible growth (SVG) adjacent to kitchen cabinetry.

Photo 11: Water staining and SVG observed to extend throughout kitchen.

Photo 12: View of staircase walls showing extensive paint damage.

18 Camsell Place, Inuvik, NT	Photo Date: 23 January 2016	Project No.: TV147020	Figure 2

Photo 13: SVG observed in the master bedroom closet.

Photo 14: SVG and water damage observed to extend over most of the exterior master bedroom wall.

Photo 15: SVG and water damage observed to extend over most of the exterior wall in smaller bedroom on second level.

Photo 16: View of extensive paint damage in closet smaller bedroom on second level**.**

Photo 17: SVG observed to cover lower portion of wall in bathroom in former location of toilet**.**

Photo 18: View of bathroom ceiling showing damaged paint and the presence on frost on the ceiling.

18 Camsell Place, Inuvik, NT	Photo Date: 23 January 2016	Project No.: TV147020	Figure 3

APPENDIX D
LABORATORY CERTIFICATES OF ANALYSES

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Inuvik Hazmat	AMEC Job No. :	TV147020
Project :	18 Camsell	Report Date :	2/5/2016
Client Project No.:	N/A	Sample Date :	23-Jan-2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 2/ 4/2016, twenty-eight (28) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246093	Linoleum kitchen ACM 01- 18 Camsell	None Detected-Sheet Flooring
246094	Linoleum kitchen, 2nd layer ACM 02- 18 Camsell	None Detected-Sheet Flooring
246095	Linoleum kitchen, below subfloor ACM 03- 18 Camsell	None Detected-Sheet Flooring None Detected-Brown Mastic
246096	9x9 tile below 2nd subfloor ACM 04- 18 Camsell	None Detected-Floor Tile None Detected-Backing None Detected-Tan Mastic
246097	Paper below 3rd subfloor ACM 05- 18 Camsell	None Detected-Paper
246098	Paper backing, fiberglass insulation dining room ceiling ACM 06- 18 Camsell	None Detected-Paper
246099	Drywall joint compound living room ACM 07- 18 Camsell	10% Chrysotile-Joint Compound

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be the client's and recipients sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

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Project :	18 Camsell	Report Date :	2/5/2016
Client Project No.:	N/A	Sample Date :	23-Jan-2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 2/ 4/2016, twenty-eight (28) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246100	Drywall joint compound laundry room ACM 08- 18 Camsell	10% Chrysotile-Joint Compound
246101	Drywall joint compound lower level bedroom ACM 09- 18 Camsell	5% Chrysotile-Joint Compound
246102	Paper below subfloor master bedroom ACM 10- 18 Camsell	None Detected-Paper
246103	Paper 2nd layer below subfloor ACM 11- 18 Camsell	None Detected-Paper
246104	Linoleum 2nd layer, bathroom ACM 12- 18 Camsell	None Detected-Sheet Flooring None Detected-Tan Mastic
246105	Linoleum, below subfloor below subfloor, bathroom ACM 13- 18 Camsell	None Detected-Sheet Flooring None Detected-Tan Mastic
246106	Drywall joint compound master bedroom ACM 14- 18 Camsell	10% Chrysotile-Joint Compound

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be the client's and recipients sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

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AMEC Job No. : TV147020
Project : 18 Camsell
Report Date : 2/5/2016
Client Project No.: N/A
Sample Date : 23-Jan-2016
Identification : Asbestos, Bulk Sample Analysis
Test Method : Polarized Light Microscopy / Dispersion Staining (PLM/DS)
EPA 600/M4-82-020 / EPA Method 600/R-93/116

On 2/ 4/2016, twenty-eight (28) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246107	Drywall joint compound bedroom 2 ACM 15- 18 Camsell	5% Chrysotile-Joint Compound
246108	Grout bathroom tile ACM 16- 18 Camsell	None Detected-Grout
246109	Mastic bathroom tile ACM 17- 18 Camsell	None Detected-Tan Mastic
246110	Drywall joint compound bathroom ACM 18- 18 Camsell	5% Chrysotile-Joint Compound
246111	Vermiculite attic ACM 19- 18 Camsell	-Actinolite Present
246112	Vermiculite attic ACM 20- 18 Camsell	-Actinolite Present
246113	Vermiculite attic ACM 21- 18 Camsell	-Actinolite Present

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client : Inuvik Hazmat
AMEC Job No. : TV147020
Project : 18 Camsell
Report Date : 2/5/2016
Client Project No.: N/A
Sample Date : 23-Jan-2016
Identification : Asbestos, Bulk Sample Analysis
Test Method : Polarized Light Microscopy / Dispersion Staining (PLM/DS)
EPA 600/M4-82-020 / EPA Method 600/R-93/116

On 2/ 4/2016, twenty-eight (28) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246114	Paper backing fiberglass insulation attic ACM 22- 18 Camsell	None Detected-Paper
246115	Shingle roof ACM 23- 18 Camsell	None Detected-Roofing Shingle
246116	Shingle roof ACM 24- 18 Camsell	None Detected-Roofing Shingle
246117	Paper below 2nd shingle roof ACM 25- 18 Camsell	None Detected-Paper
246118	Cement pipe crawl space ACM 26- 18 Camsell	30% Chrysotile-Cement Pipe 5% Crocidolite-Cement Pipe
246119	Drywall joint compound	7% Chrysotile-Joint Compound
246120	Drywall joint compound	5% Chrysotile-Joint Compound

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be the client's and recipients sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

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Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

STATEMENT OF LABORATORY ACCREDITATION

These samples were analyzed at the Atlanta Branch of Amec Foster Wheeler Environment & Infrastructure, Inc. in the Asbestos Laboratory at 2677 Buford Hwy, Atlanta, GA, 30324. The laboratory holds accreditation from the National Institute of Standards and Technology (formerly National Bureau of Standards) under the National Voluntary Laboratory Accreditation Program (NVLAP). This laboratory also is licensed and authorized to perform as an Asbestos Laboratory in the State of Texas within the purview of Texas Occupations Code, chapter 1954, so long as this license is not suspended or revoked and is renewed according to the rules adopted by the Texas Board of Health.

The samples were analyzed by polarized light microscopy in general accordance with the procedures described in the Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116. The results of each bulk sample analysis relate only to the material tested. This report shall not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

Specific questions concerning bulk sample results shall be directed to the PLM Laboratory Manager.

Analyst : James Findlay

PLM Laboratory Manager : Tom D. Morrison

Approved Signatory : _____

NVLAP
LAB CODE 101066-0

Final Analytical Report

Attention: Paul Houle

Amec Foster Wheeler Environment & Infrastructure
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Results for File: EC-70513

Project Number: TV147020
Project Name: Inuvik HazMat

Date Received: 2016/01/28
Date of Report: 2016/02/08

Report reviewed by:

Jesse Dang, B.Sc.
Manager
Laboratory Services

Kristine Connor
Director of QA/QC
Laboratory Services

** All samples will be disposed of after 30 days following analysis. Please contact the lab if you require additional sample storage time. (Samples deemed hazardous will be returned to the client at their own expense or disposal will be arranged.) **

Paint Analysis

Project No. TV147020

Final
File No. EC-70513

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1513 PB01 - 18 Camsell 2016/01/23 10:30	16-1514 PB02 - 18 Camsell 2016/01/23 10:45	16-1515 PB03 - 18 Camsell 2016/01/23 11:00	16-1516 PB04 - 18 Camsell 2016/01/23 11:15
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	1150	12	2090	45100
LL	2016/01/29	Lead	%	Calc	0.0010	0.1152	0.0012	0.2093	4.508

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1517 PB05 - 18 Camsell 2016/01/23 11:30	16-1518 TCLP42 - 18 Camsell 2016/01/23 11:45	16-1519 TCLP43 - 18 Camsell 2016/01/23 12:00	16-1520 TCLP44 - 18 Camsell 2016/01/23 12:30
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	---	0.009	0.020	28.1
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	5510	---	---	---
LL	2016/01/29	Lead	%	Calc	0.0010	0.5511	---	---	---

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1521 TCLP45 - 18 Camsell 2016/01/23 13:15
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	12.6

Quality Control Standard

Project No. TV147020 File No. EC-70513

Paint Analysis

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Analyzed Value	Advisory Range	Target Value	Reference No.
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.215	0.188-0.455	0.321	ERA D079-544
TY	2016/02/01	Lead	µg/g (ppm)	EPA 3050/6010	93	75-125	100	Metal-1

Analytical Comments

Project No. TV147020 File No. EC-70513

All Analytical results pertain to samples analyzed as received.

DL - Detection Limit

EPA: U.S. Environmental Protection Agency. 1997. Test Methods of Evaluation of Solid Waste 3rd Ed through Update III. Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

DESIGNATED SUBSTANCES SURVEY

Detached Three Bedroom Residence
221 Mackenzie Road
Inuvik, Northwest Territories

Submitted to:

Mr. Mike Molinski

Public Works Government Services Canada
100-167 Lombard Avenue
Winnipeg, Manitoba R3S 0T6

Submitted by:

Amec Foster Wheeler
Environment & Infrastructure
A Division of Amec Foster Wheeler Americas Limited
440 Dovercourt Drive
Winnipeg, Manitoba R3Y 1N4
204-488-2997

22 February 2016

Amec Foster Wheeler Project No. TV147020

EXECUTIVE SUMMARY

Public Works and Government Services Canada (PWGSC) retained Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler) conducted a designated substances survey (DSS) of the detached three bedroom residential building located at 221 Mackenzie Road in Inuvik, Northwest Territories (the 'Site'). The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and the warehouse.

The purpose of the survey was to assess the building for the presence of specific hazardous substances; namely potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing equipment, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs) in light ballasts, silica, suspect visible mould growth (SVG) and toxic characteristic leaching procedure (TCLP) testing for lead.

At the time of the Site inspection, the property was developed with a two storey residential building with an above ground crawl space constructed on wood pilings. The building was vacant at the time of the Site visit and reported by PWGSC to have been constructed in 1959. Based on the PWGSC terms of reference of the project, the building is scheduled for demolition.

Based on Amec Foster Wheeler's field assessment and laboratory results, identified ACMs included cement wastewater pipes observed in the crawl space, vinyl roll flooring (commonly referred to as linoleum) observed in the bathroom, vinyl floor tile observed in the front entrance, gypsum board joint compound observed in various locations throughout the building and vermiculite insulation observed in the attic. Amec Foster Wheeler recommends that identified ACMs be removed using Low, Moderate and High Risk asbestos abatement procedures.

Amec Foster Wheeler identified several LCP surface coatings which may be affected by building demolition activities. LCP was confirmed in interior paints on both levels and in exterior paints. Five of the nine samples collected were above the total lead content for disposal at a regular landfill. One of the five samples submitted for leachate testing also having TCLP lead concentration exceeding the applicable regulatory value and thus considered hazardous waste for the purpose of disposal.

There were no fluorescent lamp ballasts observed. In the event that lamp ballasts are discovered, it good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed. All PCB-containing ballasts, known or assumed, must be stored and transported in accordance with applicable Territorial and Federal hazardous waste and transportation of dangerous goods legislation

Amec Foster Wheeler observed a mercury containing thermostat at the Site. Prior to demolition activities all mercury-containing equipment shall be removed.

There was no equipment or others materials suspected of containing ODSs other than one domestic refrigerator. All equipment suspected of containing ODSs should be inspected by a qualified technician prior to removal or disposal and if found to contain ODS, the unit must be decommissioned in accordance with federal and territorial regulations.

SVG was not observed on Site. SVG may be present within enclosed spaces and may have not been evident during the Site visit. SVG does not require removal prior to demolition, however worker precautions are required.

Further discussion of the identified designated substances and recommendations are provided in the body of this report.

TABLE OF CONTENTS

EXECUTIVE SUMMARY I

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE 1

1.1 SCOPE OF WORK 1

2.0 DESCRIPTION OF SITE 2

3.0 SURVEY RESULTS 2

3.1 ASBESTOS-CONTAINING MATERIALS 2
3.2 LEAD AND LEAD-CONTAINING PAINT 4
3.3 MERCURY CONTAINING DEVICES 4
3.4 OZONE DEPLETING SUBSTANCES 5
3.5 POLYCHLORINATED BIPHENYLS 5
3.6 SUSPECT VISIBLE GROWTH & WATER DAMAGE 5

4.0 RECOMMENDATIONS FOR FUTURE DEMOLITION 5

4.1 ASBESTOS-CONTAINING MATERIALS 5
4.2 LEAD AND LEAD CONTAINING PAINT 6
4.3 MERCURY CONTAINING DEVICES 6
4.4 OZONE DEPLETING SUBSTANCE 6
4.5 POLYCHLORINATED BIPHENYLS 7
4.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE 7
4.7 OTHER RECOMMENDATIONS 7
4.8 GENERAL WORKER PROTECTION 7

5.0 SURVEY LIMITATIONS 7

6.0 CLOSURE 8

LIST OF APPENDICES

Appendix A Survey Definitions and Methodology
Appendix B Sampling Summary Tables
Appendix C Site Photographs
Appendix D Laboratory Certificates of Analyses

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler), was retained by Public Works and Government Services Canada (PWGSC) to conduct designated substances survey of the existing detached three bedroom residential building located at 221 MacKenzie Road, in Inuvik, NT (the 'Site').

Amec Foster Wheeler understands that the purpose of the survey was to assess the structure for the presence of specific designated substances (DS) that may require special handling prior to renovation or demolition activities. Specific DS to be surveyed for included potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing devices, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs), and suspect visible mould growth (SVG). Based on the PWGSC terms of reference (TOR) for the project, the building is scheduled for demolition. Demolition requirements are presented in the findings and recommendations of the report as appropriate.

The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and warehouse.

1.1 SCOPE OF WORK

As stipulated in Amec Foster Wheeler's proposal dated 21 December 2015, the proposed scope of work was to include the following activities. The scope of work encompassed the completion of the following tasks for eight residential and two industrial buildings, each located in Inuvik, Northwest Territories.

- Conduct a DS survey of existing structure, including field and laboratory testing to confirm the presence/absence of materials of concern;
- Where reasonable within the context of the project budget and scope, provide quantities of DS associated with the building structure; and
- Prepare a DSS report for each individual structure.

Amec Foster Wheeler completed the above tasks for accessible areas within the subject building.

A detailed summary of Amec Foster Wheeler's sampling methodology and definitions associated with the designated substances of concern are provided in Appendix A.

Amec Foster Wheeler completed the field assessment portion of the above scope of work on 21 January 2016. PWGSC did not provide Amec Foster Wheeler any reports on the building for review.

2.0 DESCRIPTION OF SITE

At the time of the Site inspection, the property was developed with a three bedroom residence. The building was of two storey construction with an above ground crawlspace constructed on wood pilings. The crawl space was enclosed and heated with access provided via an exterior access hatch. The building was reported by PWGSC to have been vacant for a period of five years and constructed in 1959.

The building was generally in poor to fair condition and appeared to have undergone some renovations since construction. The building was heated and had electrical services.

The general Site construction details were as follows:

Exterior Walls:	The exterior walls of the building were observed to be wood framing finished with vinyl clad siding.
Roof:	The roof was observed from the ground to be pitched, and finished with asphalt shingles. Observations were limited due to heavy snow cover.
Interior Walls:	Interior walls consisted of painted gypsum board.
Floor:	The flooring consisted of a combination of vinyl roll flooring (commonly referred to as linoleum), vinyl floor tile and carpet. Multiple layers of flooring were noted in some locations
Interior Ceilings:	The ceilings consisted of painted gypsum board.
Lighting:	Lighting was provided by incandescent bulbs.
Mechanical:	Heating was provided by a natural gas fired boiler located in the crawlspace.

Site photographs taken at the time of the site visit are provided in Appendix C.

3.0 SURVEY RESULTS

Ms. Karen Fortin and Mr. Mark Miller of Amec Foster Wheeler coordinated site inspection activities with Mr. Wally Ballas of PWGSC (Inuvik) who provided access and Site information for each of the structures.

Amec Foster Wheeler conducted a visual assessment of all accessible areas of the building as outlined in Appendix A: Survey Definitions and Methodology.

Photographs showing the Site condition and sample locations are provided in Appendix C.

3.1 ASBESTOS-CONTAINING MATERIALS

During the survey of the Site, Amec Foster Wheeler collected samples of suspect ACMs which were submitted to Amec Foster Wheeler's Asbestos Laboratory in Atlanta, Georgia for confirmatory laboratory analysis. A total of twenty samples of approximately nine separate building materials were collected and submitted for analysis. The results of Amec Foster Wheeler's ACM sampling activities are summarized in Tables 1 and 2 of Appendix C, digital

photographs of representative sampled materials are included in Appendix B, and the laboratory certificates of analysis are included in Appendix D.

ACMs identified include the following. All materials were generally observed in fair to good condition.

a) **Cement wastewater pipe (Transite; non-friable)** – observed in the crawlspace, was determined to contain 30% Chrysotile and 5% Crocidolite asbestos fibres based on sample ACM-05 (Photo 3).
b) **Vinyl floor tile (VFT; non-friable)** – the VFT located in the front entrance was determined to contain 7% Chrysotile asbestos fibres based on sample ACM-07 (Photo 4).
c) **Gypsum board joint compound (GBJC; friable)** - was observed throughout the building and was determined to contain between 2 - 10% Chrysotile asbestos fibres based on samples ACM-09, ACM-11, ACM-12, ACM-13 and ACM-18. Most of the interior walls appeared to generally be in good condition with some cracking and paint peeling observed.
d) **Vinyl roll flooring (VRF; friable backing)** – the bottom layer of VRF located in the bathroom was determined to contain 25% Chrysotile asbestos fibres based on sample ACM-16 (Photo 9).
e) **Vermiculite insulation (friable)** – was observed throughout the attic. Actinolite asbestos fibres were present based on samples ACM-21, ACM-22 and ACM-23 (Photo 11).

There were a number of other suspect ACMs present in the building that were sampled and, based on the laboratory analysis undertaken, are not considered to be ACMs including the following:

- Vinyl roll flooring (excluding sample ACM-16) in two styles observed at surface at two locations;
- Vinyl floor tiles (excluding sample ACM-07) collected in the bathroom at surface;
- Mastic under VFTs and VRFs;
- Insulation backing (black paper);
- Exterior building wrap; and
- Roofing materials (3 samples).

ACMs may be present in forms that were not observed or sampled during the Site inspection including, but not limited to, caulking, fire rated doors, thermal insulating materials such as gaskets associated with mechanical equipment, wiring and electrical components, packing associated with cast iron pipe joints, or in areas that were not accessible at the time of the survey.

For the purpose of renovation, demolition, or any other alteration or disturbance, all suspect ACMs, unless confirmed through sampling and analysis, should be considered to contain asbestos and handled in accordance with a written work plan that references current Territorial

guidelines as presented in the *Northwest Territories & Nunavut Code of Practice on Asbestos Abatement"* (2012).

3.2 LEAD AND LEAD-CONTAINING PAINT

Based on the date of original building construction (1959), there is a potential that LCP and other lead containing materials may have been used during construction of the original building or subsequent renovations. Amec Foster Wheeler submitted eight samples of paint for laboratory analysis. At the discretion of the assessor, painted surfaces sampled items included representative walls, ceilings and exterior decks and railings. The paint on the interior walls was also generally present on the trim located throughout the building. As explained in the report methodology, the sampling program considered typical paint coatings and not all surfaces were tested and mechanical equipment was not sampled. The samples were submitted to Amec Foster Wheeler's laboratory in Edmonton, Alberta for analysis of total lead content. The total lead concentration of the paint samples ranged from 370 mg/kg (parts per million) to 34,400 mg/kg (ppm). The highest total lead concentration in paint was determined to be 34,400 mg/kg (ppm) from the beige paint (with various sub-layers) recovered from the exterior door of the crawlspace (PB-03).

As discussed in the Methodology Section, surface coatings with a lead content greater than 0.06% by weight (600 mg/kg) considered to be LCPs for the purposes of this report. Laboratory results show that six of the nine samples collected are considered to be LCP.

Amec Foster Wheeler also submitted five of the above samples for further analysis using the toxicity characteristic leaching procedure (TCLP). According to the Guideline for Industrial Waste Discharges in the Northwest Territories, the maximum allowable lead content in leachate from solid waste is 5.0 mg/L. One of the TCLP samples collected, TCLP 28 (front deck, grey paint and sub-layers), was analysed to have a TCLP concentration of 19.1 mg/l, above the maximum allowable lead content for solid waste of 5.0 mg/L.

Results of the laboratory analyses are summarized in Table 3 (Appendix B), digital photographs of the sample locations are included in Appendix C, and the Laboratory's Certificates of Analyses are included in Appendix D.

One sample of joint seal between a cement coupler and cast iron wastewater pipe in the crawl space was collected. The sample was analyzed to contain 125,000 mg/Kg lead. Based on the visual survey of the building, other products on-Site that may contain lead include copper plumbing fixture solders, plumbing fittings, cable coverings, and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials.

3.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler observed one mercury-containing thermostat within the Site. Other potential mercury containing equipment includes switches associated with the building mechanical systems although these were not observed.

3.4 OZONE DEPLETING SUBSTANCES

Amec Foster Wheeler observed one refrigerator in the kitchen which is suspected to contain ozone depleting substances.

All equipment suspected of containing ODSs should be inspected by a qualified technician prior to removal or disposal and if found to contain ODS, the unit must be decommissioned in accordance with federal and territorial regulations.

3.5 POLYCHLORINATED BIPHENYLS

There were no fluorescent light fixtures observed at the Site.

3.6 SUSPECT VISIBLE GROWTH & WATER DAMAGE

Amec Foster Wheeler did not observe SVG or substantial water damage at the Site. SVG may be present within enclosed spaces and may have not been evident during the Site visit.

4.0 RECOMMENDATIONS FOR FUTURE DEMOLITION

The demolition recommendations for the materials identified in the building are provided below. It is assumed that all work will be completed on the vacant building in an area restricted to the public. All demolition activities shall be carried out in accordance with CSA standard S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures, the National Building Code Section 8 (Safety Measures at Construction and Demolition Sites) and other related sections.

All work shall be completed by qualified workers following written safe work procedures, in accordance with requirements of the *General Safety Regulation*, under the Northwest Territories *Safety Act*.

4.1 ASBESTOS-CONTAINING MATERIALS

Recommendations for the removal of ACMs identified in each of the proposed work areas are provided below. Completion of any of these recommendations must be performed by qualified asbestos workers or abatement contractors and in accordance with a written work plan prepared based on existing current territorial regulations and/or guidelines.

a) **Vinyl roll flooring (friable backing, approximately 3.75 m^2) -** observed in the bathroom, may be removed by following Moderate Risk asbestos abatement procedures.
b) **Vinyl floor tiles (non-friable, approximately 43 m^2) -** observed in the front entrance, living room, dining room, lower level bedroom. May be removed following Low Risk asbestos abatement procedure.
c) **Cementitious pipe and coupler (non-friable, approximately 3 m) -** observed in the crawlspace, may be removed following Low Risk asbestos abatement procedures.
d) **Gypsum board joint compound (friable, approximately 496 m^2)** - was observed throughout the building on walls and ceilings. This material may be removed following Moderate Risk asbestos abatement procedures**.**
e) **Vermiculite insulation (friable, approximately 55 m^2)** – observed throughout the attic may be removed following High Risk asbestos abatement procedures.

As previously stated, ACMs may be present in forms that were not observed or sampled during the Site inspection including, but not limited to, caulking, fire rated doors, thermal insulating materials such as gaskets associated with mechanical equipment, wiring and electrical components, or other materials in areas that were not accessible at the time of the survey.

4.2 LEAD AND LEAD CONTAINING PAINT

Amec Foster Wheeler identified five LCP surface coatings which will be affected by building renovation or demolition activities. These are not suitable for disposal at a landfill in the Northwest Territories and a suitable disposal location will need to be identified. One of the five TCLP samples collected by Amec Foster Wheeler was above the maximum allowable lead leachate concentration for demolition debris. This is not suitable for disposal at a landfill in the Northwest Territories and will need to be considered as hazardous waste for disposal. It is anticipated that the LCP coated building materials would be disposed as one unit rather than the LCP removed.

The remaining painted demolition debris is expected to be disposed of at most construction landfills without restrictions, however this should be confirmed with the landfill receiving the demolition waste prior to demolishing the building so that any requirements for special handling or disposal can be determined and suitable arrangement made.

Based on the visual survey of the building, other products on-Site that may contain lead include copper plumbing fixture solders, plumbing fittings, cable coverings, and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials.

All workers who may be exposed to lead must undergo hazard specific awareness training. All workers who may be performing activities that may create airborne lead dust, such as grinding, cutting, sandblasting or welding, should wear personal protective equipment including appropriate respiratory equipment, dermal protection and disposable coveralls. As lead containing paint poses a greater concern when heated, such as during welding operations, it is considered good practice to remove lead containing paint from surfaces to be welded or otherwise heated. Workers should also follow appropriate decontamination procedures prior to leaving the work area.

4.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler observed one mercury-containing thermostat within the Site. The presence of mercury in fluorescent lamps and thermostats poses minimal risks to occupants or workers provided the equipment is handled properly and the mercury is not allowed to escape. Prior to demolition activities all mercury-containing equipment must be removed.

4.4 OZONE DEPLETING SUBSTANCE

One refrigerator was observed in the kitchen on site which is suspected to contain an ODS. Any suspect equipment discovered during demolition/renovation, should be inspected for the presence of ODSs and handled or disposed of in accordance with current Federal and Territorial regulations which shall be completed by trained and qualified technicians.

4.5 POLYCHLORINATED BIPHENYLS

No fluorescent light fixture was observed on Site. It is considered good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed. If 'non-PCB' or 'No PCBs' labelling is not found on the ballasts, the ballasts should be compared to information obtained from the manufacture to determine PCB content. If the PCB content of the ballast cannot be determined, the ballast should be assumed to contain PCBs unless laboratory testing indicates otherwise. All PCB-containing ballasts, known or assumed, must be stored and transported in accordance with applicable Territorial and Federal hazardous waste and transportation of dangerous goods legislation

4.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE

Amec Foster Wheeler did not observe any suspect visible growth (SVG) or water damage on Site. SVG may be present within enclosed spaces and may have not been evident during the Site visit.

4.7 OTHER RECOMMENDATIONS

For demolition purposes, It is recommended that all work be conducted in accordance with a Site specific demolition plan which should address such items as abatement, demolition methods, worker training and protection, decontamination procedures, dust suppression, and transportation and disposal of waste. It is expected that the demolition contractor will prepare such documents based on direction provided in project specification documents which are to be developed at a later date.

4.8 GENERAL WORKER PROTECTION

While all identified designated substances were in fair to good condition or otherwise had limited access (attic space), Amec Foster Wheeler recommends that any areas where designated substances are present which may pose a worker exposure issue, be isolated and the area restricted to knowledgeable workers with appropriate personal protection equipment. Given that the Site is partially vacant and minimum maintenance is expected, the Site conditions are subject to change.

5.0 SURVEY LIMITATIONS

Within the limitations of the agreed-upon scope of work, the field observations, measurements and analysis are considered sufficient to provide an overview of existing potential concerns or form a general inventory of hazardous materials in the subject area of the building. It should be noted that the data presented herein were collected at specific sampling locations, and depending on the homogeneity of the samples, the data may vary between these locations. Some inherent limitations exist as to the thoroughness of this assessment due to the nature of building construction. For example it may not practical to test all pipe insulation for asbestos content at the Site due to the amount and locations and being located under existing materials. Some reasonable extrapolation (e.g., sampling of similar materials) was required from the findings of the assessment.

Reasonable efforts were made to identify all substances designated in this report; however, Amec Foster Wheeler may not have been able to identify and assess all suspect designated substances, as certain building materials may exist that were not visible or accessible at the time of the survey. Inaccessible locations include those that require demolition to gain entry, which present an unacceptable health or safety risk to the surveyors, and where entry is prohibited by security or other institutional restrictions. Areas above a suspended tile ceiling, crawl spaces, pipe chases and service tunnels, and areas behind an access hatch were considered accessible. Materials hidden by walls, finishes and equipment at the time of the survey were considered inaccessible.

The field observations, measurements and analysis are considered sufficient to form a general inventory of hazardous materials in the surveyed areas. It is possible that materials may exist which could not be reasonably identified within the scope of the assessment or which were not apparent or accessible during the Site visit. Within the limitations of the agreed-upon scope of work, the survey included building materials found within or forming part of the building envelope and building mechanical systems and equipment. The inspection did not include the identification of suspected hazardous materials located in the interior of electrical, mechanical (i.e. interior surfaces of ventilation ducting, boilers, etc.), or process manufacturing equipment, inside wall cavities (e.g., pipe chases), inaccessible ceiling plenums, sub floors, underlying materials (e.g., underlying flooring and paint layers), and where sampling could have affected the integrity of the system (e.g., water-proof roof membrane and caulking). Amec Foster Wheeler is not responsible for the repairs of building materials that were sampled during the survey.

This assessment has been undertaken and performed in a professional manner in accordance with generally accepted practices, using the degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. The findings of this report are based solely on the conditions of the Site encountered at the time of the Site visit on 21 January 2016, and are limited by the availability of information at the time of the survey. Due to physical limitations inherent to this work, Amec Foster Wheeler expressly does not warrant that the Site is free of designated substances or that all designated substances have been identified. It is possible that materials exist which could not be reasonably identified within the scope of the survey or which were not apparent or accessible during the site visit. No other warranties, expressed or implied, are made.

6.0 CLOSURE

This report was prepared for the exclusive use of Public Works and Government Services Canada and is intended to provide an overview of existing potential concerns within the specified work area at the time of the Site visit. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Amec Foster Wheeler is required. With respect to third parties, Amec Foster Wheeler has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

Amec Foster Wheeler has prepared this report for the express use of Public Works and Government Services Canada and may be relied upon by Public Works and Government Services Canada. No other person or organization is entitled to rely upon any part of this report without the prior written consent of Amec Foster Wheeler. Public Works and Government Services Canada may release all or part(s) of this report to third parties; however, such third party in using this report agrees that it shall have no legal recourse against Amec Foster Wheeler or its subsidiaries, and shall indemnify and defend Amec Foster Wheeler or its subsidiaries from and against all claims arising out of or in conjunction with such use or reliance.

This report does not constitute legal advice. Amec Foster Wheeler makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel. In addition, Amec Foster Wheeler makes no determination or recommendation regarding the decision to purchase, sell or provide financing for this property.

This report presents an overview of issues of concern with the specified substances, reflecting Amec Foster Wheeler's best judgment using information reasonably available at the time of Amec Foster Wheeler's evaluation / survey. In preparing this report, Amec Foster Wheeler has relied upon certain information and representations provided by others. Amec Foster Wheeler did not attempt to independently verify the accuracy or completeness of that information. To the extent that the conclusions in this report are based in whole or in part on such information, those conclusions are contingent on its accuracy and validity. Amec Foster Wheeler assumes no responsibility for any consequence arising from any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to Amec Foster Wheeler.

This Report is subject to the contractual project agreement.

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

Respectfully,
Amec Foster Wheeler Environment & Infrastructure,
a Division of Amec Foster Wheeler Americas Limited,

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APPENDIX A
SURVEY DEFINITIONS AND METHODOLOGY

SURVEY DEFINITIONS, METHODOLOGY AND REGULATORY REQUIREMENTS

1.0 FIELD METHODOLOGY

The survey generally consisted of a room-by-room survey of all accessible areas within the buildings surveyed. The surveyor identified potential designated substances by appearance, age, and knowledge of current and historical uses of the Site and subject materials. Accessible locations are those for which entry is not prohibited by security or other institutional restrictions, that could be inspected without the need for destructive testing (e.g. penetration of a surface such as a wall, ceiling chase or shaft to gain access), and which did present an unacceptable health or safety risk to the surveyor. The area above a suspended tile ceiling, crawlspaces, pipe chases / service tunnels or behind an access hatch was generally considered to not be accessible. Materials hidden by walls, finishes and equipment at the time of the survey are considered inaccessible. Reasonable effort was used to identify potential designated substances in areas not readily accessible, such as confined areas enclosed by gypsum board, plaster, or panelling, etc., or where minor demolition was required to gain entry.

Intrusive sampling may have been conducted in the form of collecting samples of pipe insulation and other building materials, removing baseboards, lifting areas of carpet or flooring and cutting or breaking small holes in wallboard or plaster. Amec Foster Wheeler only performed such activities in areas where operation of the facility and the health and safety of occupants was affected. Effort was made to minimize or conceal damage. Amec Foster Wheeler was not responsible for the repair of any other areas sampled as part of this evaluation with the exception of temporary repairs to leave area in safe workplace condition.

While in the field, the surveyor completed a detailed checklist or collected detailed field notes for the building; a description of the rooms and a detailed description of any suspected designated substances observed within the rooms. Details of condition, visibility / accessibility, and any action that may be required to reduce asbestos fibre or other designated substances exposure hazards based on these observations were also recorded.

2.0 ASBESTOS-CONTAINING MATERIALS

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

The WSCC Asbestos Abatement Code of Practice states: “If asbestos-containing materials are identified and there is the potential for exposure, corrective action is required.” The Code of Practice also recommends considering the location, condition, function and cost prior to following the four basic approaches to controlling exposure: removal, encapsulation, enclosure and a management plan. The Code of Practice includes information on the techniques for the identification, safe abatement of asbestos-containing materials, and information on asbestos products, health hazards, worker protection, safe work procedures, inspection criteria,

applicable legislation and competency for those involved in abatement activities. This Code was adopted from the Alberta Asbestos Abatement Manual (2011).

In Northwest Territories, the *Occupational Health and Safety Regulations, Part 24* defines "asbestos" as a manufactured article or other material which contains 1% or more asbestos by weight either at the time of manufacture, or as determined by the following method:

- NIOSH Method 9002, as amended from time to time, from the NIOSH Manual of Analytical Methods, 4th Edition, published by the National Institute for Occupational Safety and Health, United States.

Friable material refers to an ACM that can be readily crumbled using hand pressure, separating asbestos fibres from the binding materials with which they are associated. Typical friable materials include acoustical or decorative spray applications, fireproofing, refractory and thermal insulation.

Non-friable material refers to an ACM that is associated with a binding agent (such as tar or cement) that prevents the ready release of airborne fibres. Typical non-friable materials include floor tiles, fire blankets, pre-formed manufactured cementitious insulation and wallboards, pipes, and siding. These materials are generally considered to pose a low hazard provided they remain intact and are not cut or shaped with power tools that are not equipped with a HEPA filtered dust collection system.

Amec Foster Wheeler collected samples of suspected ACMs and submitted them to EMC Labs Inc. (EMC) laboratory in Phoenix, Arizona and Amec Foster Wheeler's lab in Atlanta, Georgia for analysis. Both are National Voluntary Laboratory Accreditation Program (NVLAP) certified laboratories. The samples were analyzed using Polarized Light Microscopy (PLM) methods (EPA 600/R-93/116).

3.0 LEAD and LEAD CONTAINING PAINT

In building construction, lead was frequently used for roofs, cornices, tank linings, electrical conduits, and as a main component of soft solder ally used to seal pipe joints. Lead was also used extensively for pigmentation, sealing, and as a drying agent in oil based paints up until the early 1950's. Exterior paints typically contained up to 60% lead by weight.

In 1976, the Canadian Federal Government introduced the Liquid Coating Materials Regulations under the Federal Hazardous Products Act, restricting the maximum total lead content of paints and other liquid coating materials used in or around premises attended by children or pregnant women to 0.5% by weight (5000 mg/kg). In January 1991, Health Canada negotiated a voluntary reduction of lead content in all Canadian produced consumer paint to a maximum of 0.06%. Recently the Canadian Federal Government enacted the Surface Coating Materials Regulations which reduce the maximum total lead content of any new surface coatings for consumer products to 0.009% (90 mg/kg). This reduction does not generally apply to surface coating applied to buildings or other structures used for agricultural or industrial purposes or as an anti-weathering or anti-corrosive coating.

Northwest Territories *Environmental Protection Act* (EPA) considers a lead containing paint as any structural coating containing greater than 0.06% by weight (600 mg/kg). Surface coatings containing 600 mg/kg or 0.06% lead would be considered to represent a higher risk of exposure

to workers if disturbed during demolition activities. Removal or disturbance of paint coatings exceeding this concentration would require abatement or implementation of appropriate lead dust controls.

The *Guideline for the General Management of Hazardous Waste* describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste lead and lead paint debris. According to the *Guideline for Industrial Waste Discharges in the NT*, the maximum allowable lead content in leachate from solid waste including demolition debris is 5.0 milligrams per liter (mg/L).

In the preparation of this report, Amec Foster Wheeler consulted with Government of the Northwest Territories Environment Division who indicated that the current guidelines are under revision but are still to be followed. They further confirmed that any LCP (greater 600 mg/kg total or greater than 5.0 mg/kg TCLP) are not suitable for disposal at landfills in the Northwest Territories.

The survey included a description of typical building materials suspected to contain lead. Details of location, description, and condition were recorded. The survey included the collection of select bulk samples of readily accessible building materials suspected to contain a surface coating defined as a LCP. Paint chip samples were analyzed in accordance with U.S. EPA SW 846 3050 6010C for lead.

4.0 MERCURY

As part of the survey, Amec Foster Wheeler checked for such items as mercury containing thermostats, switches and lamps. Based on information provided by the U.S. Environmental Protection Agency (EPA), small commercial switches and thermostats may contain 2 to 18 mg of mercury with industrial switches and equipment containing 5 kg or more. According to published literature, older mercury containing lamps, the bulk of which are four foot T-12 fluorescent lamps, can contain up to 80 mg of mercury per lamp. Newer T-12, T-8 and T-5 style fluorescent lamps manufactured since 2000 have in the order of 3 to 12 mg of mercury per lamp. Other types of lamps, such as metal halide and high pressure sodium, can also contain mercury in the order of 20 to 250 mg/lamp.

The Canadian Council of Ministers of the Environment (CCME) *"Canada-Wide Standard for Mercury Containing Lamps"* (2001) is largely geared towards reducing the amount of mercury in lamps at the manufacturing stage; however they do recommend that the release of mercury can be minimized through the proper recycling and disposal of mercury containing lamps.

The *Guideline for the General Management of Hazardous Waste* describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste mercury. According to the Guideline for Industrial Waste Discharges in the NT, the maximum allowable mercury content in leachate from solid waste is 0.1 milligrams per liter (mg/L). The *Guide to Recycling Mercury-Containing Lamps* states that "*testing done in the NWT has confirmed that crushed mercury-containing lamps may not pass the leacheate test and therefore, are managed as hazardous waste*". Waste management and transfer of designated

substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

5.0 POLYCHLORINATED BIPHENYL (PCB)

PCB-containing products were manufactured for use in applications where stable, fire-resistant, and heat-transfer properties were demanded between 1926-29 and 1977. Most PCBs were sold for use as dielectric fluids (insulating liquids) in electric transformers and capacitors. Other uses included heat transfer fluid, hydraulic fluid, dye carriers in carbonless copy paper, plasticizers in paints, adhesives, and caulking compounds. In Canada, PCBs were prohibited from being used in products, equipment, machinery, electrical transformers and capacitors that were manufactured or imported into the country after July 1980. However, older equipment in use after this date may still contain PCBs if the equipment's fluid has not been changed, or if there was sufficient inventory of such equipment.

As part of the survey, Amec Foster Wheeler assessed the Site for the presence of potential PCB-containing materials. Potential PCB-containing equipment or materials were identified by appearance, age and knowledge of current and historical uses of the Site and subject materials. The possible presence of PCBs in the fluorescent or other lamp ballasts was determined based on a visual assessment and the 1991 Environment Canada document entitled "*Identification of Lamp Ballasts Containing PCBs*." Light fixtures were characterized by type and a representative number of fixtures were examined in each functional area of the building, where accessible. Suspect electrical equipment including lighting ballasts was examined, where accessible.

There is a lack of clear Provincial / Territorial / Federal Regulatory framework to provide guidance on PCBs in building construction materials, particularly with respect to non-typical materials such as surface coatings and building materials. The regulations pertaining to PCBs are more related to liquids associated to electrical equipment and contaminated materials as opposed to PCBs in construction materials. The threshold for solid waste process residuals suitable for landfill as listed in the Guideline for Industrial Waste Discharges in the NWT is 50 mg/L by mass. Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

PCBs are also regulated under the Federal Canadian Environmental Protection Act, 1999, PCB Regulation SOR/2008-273 which came into force September 2008 and subsequent amendment regulation SOR 2010-57; (http://www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=105). The Federal PCB regulations generally establish deadlines for ending the use and long term storage of PCBs and products containing PCBs. PCB-containing equipment or any PCB-containing substance with a PCB concentration at or in excess of 2 ppm for liquids and 50 ppm for solids (which pertain to applied surface coatings such as paint) are subject to the above Federal regulations.

Select paint samples were submitted for PCB analysis. Paint samples analysed were determined based on general industry literature which indicated industrial paint coatings exhibiting elastomeric properties or durable paints may contain PCBs. Such coatings may be applied to or used as floor markings, exterior doors, railings and concrete surfaces. Paint samples were randomly selected to get a general representation of the building surveyed. Paint samples were analysed by Amec Foster Wheeler's Edmonton Laboratory.

6.0 OZONE DEPLETING SUBSTANCES

As part of the survey, Amec Foster Wheeler checked for equipment or materials which may contain ODS such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons. Typically these ODSs may be used as refrigerants, propellants, in the manufacture of items such as packaging, insulation, solvents and halon based fire extinguishing agents.

In Canada, the production or import of CFCs were banned in January 1996. CFCs were developed in the 1930s for use as a substitute refrigerant to ammonia. While less damaging to the ozone layer, HCFCs are scheduled to be phased out in Canada between the years 2010 and 2020.

In Canada, the Federal and Provincial governments have legislation in place for ODSs. Federally, ODS is regulated under the Federal Halocarbon Regulations (SOR/2003-289 and amendment regulation SOR/2009-221; (http://ec.gc.ca/ozone/default.asp?lang=En&n=E06A6B0D-1) which are under the authority of the Federal Environmental Protection Act (1999). The purpose of the Federal Halocarbon Regulation is to regulate the use, identification, leak testing and disposal of ODSs on a Federally owned property.

7.0 MOULD

Mould spores are ubiquitous in both indoor and outdoor environments and in the presence of adequate moisture, may pose a concern in a building environment. Suspected mould growth on building materials was identified by visual growth (referred to as suspect visual mould growth; SVG) or evidence of water intrusion / damage. Based on the walk-through and observations Amec Foster Wheeler performed a walk-through visual inspection of the site for evidence of substantial moisture issues and mould reservoirs and/or amplifiers. The presence and extent of any SVG and water damage was determined using reasonable means noting that Amec Foster Wheeler may not have been able to identify all possible fungal reservoirs, as certain materials may be hidden by walls, finishes and equipment.

No samples of SVG were collected as part of the project scope of work.

There are currently no regulations specifically covering exposure to mould and/or mould remediation practices in Canada and there are no occupational exposure limits that define acceptable levels of mould exposure without adverse health effects. Direction on the assessment and remediation of mould in this report is based on the *"Mould Guidelines for the Canadian Construction Industry"* Canadian Construction Association (document CCA82). February 2004.

8.0 REGULATORY REQUIREMENTS

Sections 122.1 and 125.1 of the Canada Labour Code (R.S.C., 1985, c. L-2) and Part X of the Canada Occupational Health and Safety Regulations (SOR/86-304) address asbestos/hazardous substances in federally operated workplaces.

As per the Canada Labour Code:

- Section 122.1: “hazardous substance” includes a hazardous product and a chemical, biological or physical agent that, by reason of a property that the agent possesses, is hazardous to the safety or health of a person exposed to it.
- Section 125.1 Without restricting the generality of section 124 or limiting the duties of an employer under Section 125 but subject to any exceptions that may be prescribed, every employer shall, in respect of every work place controlled by the employer and, in respect of every work activity carried out by an employee in a workplace that is not controlled by the employer, to the extent that the employer controls the activity, (a) ensure that concentrations of hazardous substances in the work place are controlled in accordance with prescribed standards; (b) ensure that all hazardous substances in the work place are stored and handled in the manner prescribed; (c) ensure that all hazardous substances in the work place, other than hazardous products, are identified in the manner prescribed.
- Part X of the Canada Occupational Health and Safety Regulations Section 10.19 (1) states: “An employee shall be kept free from exposure to a concentration of […] (c) airborne chrysotile asbestos in excess of one fibre per cubic centimetre.”

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

Waste management and transfer of designated substances, is defined and outlined under the *Guideline for the General Management of Hazardous Waste in the NWT.*

APPENDIX B
SAMPLE SUMMARY TABLES

TABLE 1: SAMPLING INFORMATION SUMMARY – BULK ASBESTOS
Materials Determined to be Asbestos-Containing

Amec Foster Wheeler Sample No.	Lab ID No.	Photo No.	Sample Location Description	Sample Description	Laboratory Results	
					% Asbestos Fibres	Asbestos Type
ACM-05	246075	3	152 mm dia. cement coupler connecting 152 mm dia. cast iron and cement waste-water pipes.	Cement pipe	30	Chrysotile
				Cement pipe	5	Crocidolite
ACM-07	246076	4	Front entrance	Vinyl Floor Tile (VFT), grey and beige	7	Chrysotile
				Mastic, Tan	No Asbestos fibres detected	
ACM-9	246078	5	Back entrance corner, below closet shelf	Gypsum Board Joint Compound (GBJC)	3	Chrysotile
ACM-11	246080	6	Exterior wall of closet in lower level bedroom	GBJC	3	Chrysotile
ACM-12	246081	7	Living room wall, opposite stairway	GBJC	10	Chrysotile
ACM-13	246082	8	Staircase wall	GBJC	2	Chrysotile
ACM-16	246085	9	Bathroom floor, 2nd layer	Vinyl Roll Flooring (VRF), brown mosaic	25	Chrysotile
				Tan mastic	No Asbestos fibres detected	
ACM-18	246087	10	Closet wall in Bedroom 2	GBJC	3	Chrysotile
Dup 3	246092	--	Dup 1 *replicate of ACM-18	GBJC	3	Chrysotile
ACM-19	246088	11	Attic	Vermiculite	Presence	Actinolite
ACM-20	246089	11	Attic	Vermiculite	Presence	Actinolite
ACM-21	246090	11	Attic	Vermiculite	Presence	Actinolite

TABLE 2: SAMPLING INFORMATION SUMMARY – BULK ASBESTOS
Materials Determined to be Non-Asbestos-Containing

Amec Foster Wheeler Sample No.	Lab ID No.	Photo No.	Sample Location Description	Sample Description	Laboratory Results	
					% Asbestos Fibres	Asbestos Type
ACM-01	246071	21	Roof surface	Red asphalt shingle	No Asbestos fibres detected	
ACM-02	246072	22	Roof 2nd layer	Black asphalt shingle	No Asbestos fibres detected	
ACM-03	246073	23	Behind exterior vinyl siding	House wrap	No Asbestos fibres detected	
ACM-04	246074	24	Exterior wall of crawl space	Black paper insulation backing	No Asbestos fibres detected	
ACM-08	246077	25	Kitchen floor at surface	VRF, light and grey	No asbestos fibres detected	
				Mastic, Tan	No asbestos fibres detected	
ACM-10	246079	26	Dining room – kitchen wall at ceiling – wall corner	GBJC	No Asbestos fibres detected	
Dup 1	246091	--	Dup 1 *replicate of ACM-10	GBJC	No Asbestos fibres detected	
ACM-14	246083	27	Below window in Bedroom 1	GBJC	No Asbestos fibres detected	
ACM-15	246084	28	Bathroom floor at surface	VRF	No Asbestos fibres detected	
ACM-17	246086	29	Bathroom below subfloor	Yellow and red VFT	No Asbestos fibres detected	
				Felt	No Asbestos fibres detected	
				Tan mastic	No Asbestos fibres detected	

TABLE 3: LEAD LABORATORY RESULTS, TCLP ANALYSIS RESULTS

Sample Description and Location	Laboratory Results Total Lead (mg/kg)	Photo No.	Amec Foster Wheeler Sample No.	Toxicity Characteristic Leaching Procedure (TCLP) mg/L
White, black, green orange and white layers of paint on deck railing.	**15,600**	12	PB01 TCLP 29	4.53
Grey, white, black, green, orange and white layers of paint on deck surface.	**28,500**	13	PB02 TCLP 28	**19.1**
Beige, orange, red, white paint on exterior door to crawl space.	**34,400**	14	PB03	-
Joint seal between cement coupler and cast iron pipe.	**125,000**	15	PB04	-
Beige and blue layers of paint on dining room exterior wall without a window.	**1,190**	16	PB05 TCLP 30	0.112
Two layers of beige paint on living room wall.	479	17	PB06 TCLP 31	0.078
Beige and light green layers of paint on back entrance shelf.	**795**	18	PB07	-
Beige paint on stairway walls.	462	19	PB08 TCLP 32	0.169
White paint on sloped ceiling of bathroom.	370	20	PB09	-

APPENDIX C
SITE PHOTOGRAPHS

Photo 1: View of front of 221 Mackenzie Road in Inuvik, NT (the "Site").

Photo 2: View from rear of Site.

Photo 3: Sample ACM-05, coupler connecting 152 mm dia. cast iron and cementitious waste-water pipes was determined to contain **30% Chrysotile and 5% Crocidolite asbestos fibres.**

Photo 4: Sample ACM-07, 305 mm X 305 mm vinyl floor tile (VFT) with grey with beige line pattern, located at front entrance were determined to contain **7% Chrysotile asbestos fibres.**

Photo 5: Sample ACM-09, Gypsum Board Joint Compound (GBJC) – back entrance corner, below closet shelf, was determined to contain **3% Chrysotile asbestos fibres.**

Photo 6: Sample ACM-11, GBJC – exterior closet wall in lower level bedroom was determined to contain **3% Chrysotile asbestos fibres.**

221 Mackenzie, Inuvik, NT	Photo Date: January 2016	Project No.: TV147020	Figure 1

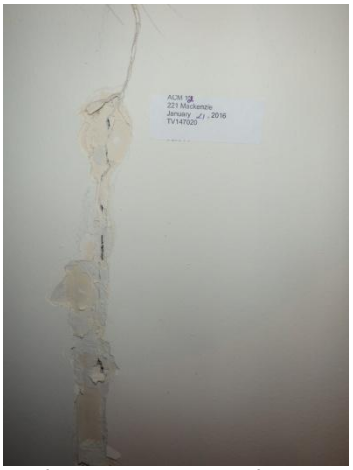

Photo 7: Sample ACM-12, GBJC along cracking joint on the living room wall, opposite stairway was determined to contain **10% Chrysotile asbestos fibres.**

Photo 8: Sample ACM-13 GBJC from crack in stairway wall opposite lower level bedroom was determined to contain **2% Chrysotile asbestos fibres.**

Photo 9: Sample ACM-16, brown mosaic vinyl roll flooring (VRF) in bathroom on second floor was determined to **contain 25% Chrysotile asbestos fibres.**

Photo 10: Sample ACM-18, GBJC on closet wall in Bedroom 2, was determined to contain **3% Chrysotile asbestos fibres**.

Photo 11: Sample ACM-19, 20 and 21, vermiculite in attic was determined to contain **Actinolite asbestos fibres present**.

Photo 12: Sample PB01/TCLP29, white, black, green orange and white layers of paint on deck railing contain **5,600 mg/kg Lead,**

221 Mackenzie, Inuvik, NT	Photo Date: January 2016	Project No.: TV147020	Figure 2

Photo 13: Sample PB02/TCLP28, grey, white, black, green, orange and white layers of paint on deck surface contain **28,500 mg/kg total Lead and 19.1 mg/L leachable lead.**

Photo 14: Sample PB03, beige, orange, red, white paint on exterior door to crawl space, was determined to contain **34,400 mg/kg lead.**

Photo 15: Sample PB04, joint seal between cement coupler and cast iron pipe was determined to contain **125,000 mg/kg lead**

Photo 16: Sample PB05, beige and blue layers of paint on dining room exterior wall without a window determined to contain **1,190 mg/kg of lead.**

Photo 17: Sample PB06, two layers of beige paint on living room wall was determined to contain **479 mg/kg lead.**

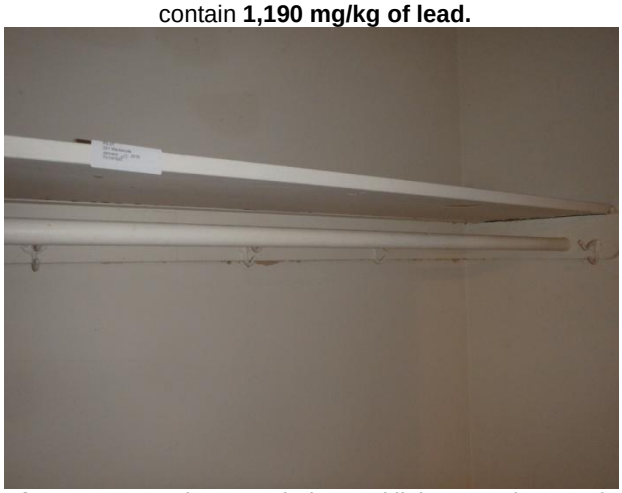

Photo 18: Sample PB07, beige and light green layers of paint on back entrance shelf, was determined to contain **795 mg/kg lead.**

221 Mackenzie, Inuvik, NT	Photo Date: January 2016	Project No.: TV147020	Figure 3

Photo 19: Sample PB08, beige paint on stairway walls was determined to contain **462 mg/kg Lead.**

Photo 20: Sample PB09, white paint on sloped ceiling of bathroom was determined to contain **370 mg/kg lead.**

Photo 21: Sample ACM-01, roof, red shingle from surface. No asbestos fibres detected.

Photo 22: Sample ACM-02, roof, black shingle, 2nd layer. No asbestos fibres detected

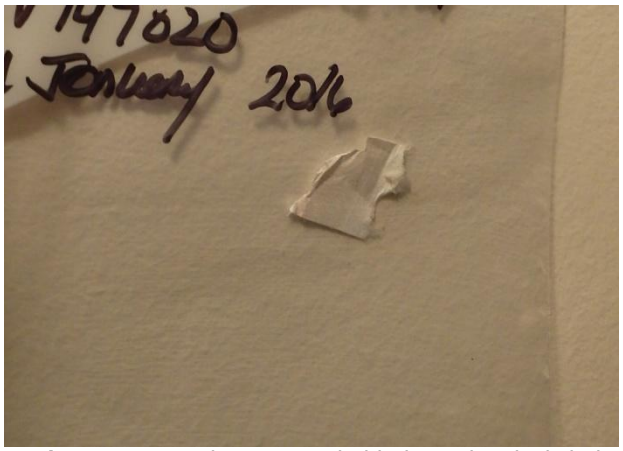

Photo 23: Sample ACM-03, behind exterior vinyl clad siding, house wrap. No asbestos fibres detected.

Photo 24: Showing location of samples ACM-04, black paper backing from insulation in crawl space. No asbestos fibres detected

221 Mackenzie, Inuvik, NT	Photo Date: January 2016	Project No.: TV147020	Figure 4

Photo 25: Sample ACM-08, light and grey textured VRF with tan mastic in kitchen. No asbestos fibres detected.

Photo 26: Sample ACM-10, GBJC in dining room on kitchen wall. No asbestos fibres detected.

Photo 27: ACM-14, GBJC in bedroom 1 below window. No asbestos fibres detected.

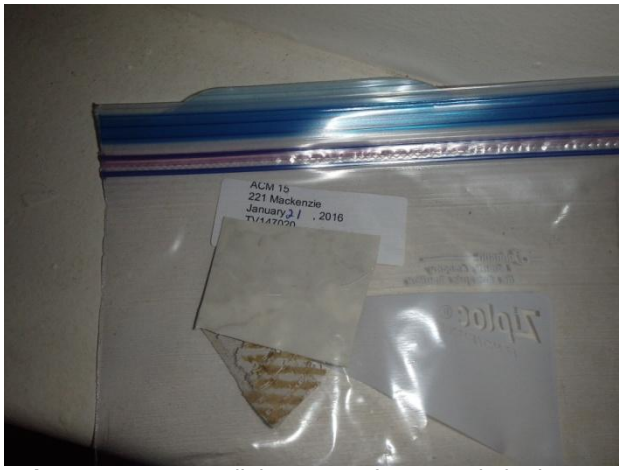

Photo 28: ACM-15, light grey surface VRF in bathroom. No asbestos fibres detected.

Photo 29: ACM-17, Yellow and red 228 mm X 228 mm VFT, including felt and tan mastic, in bathroom below subfloor. No asbestos fibres detected.

Photo 30: Mercury thermostat.

221 Mackenzie, Inuvik, NT	Photo Date: January 2016	Project No.: TV147020	Figure 5

APPENDIX D

LABORATORY CERTIFICATES OF ANALYSES

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Inuvik Hazmat	AMEC Job No. :	TV147020
Project :	221 Mackenzie	Report Date :	2/5/2016
Client Project No.:	N/A	Sample Date :	01/21/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 2/ 4/2016, twenty-two (22) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246071	Shingle Surface, Roof ACM 01 - 221 Mac	None Detected-Roofing Shingle
246072	Shingle 2nd Layer, Roof ACM 02 - 221 Mac	None Detected-Roofing Shingle
246073	Paper backing behind vinyl siding ACM 03 - 221 Mac	None Detected-Paper Backing
246074	Paper backing insulation, crawl space ACM 04 - 221 Mac	None Detected-Paper Backing
246075	Cement pipe coupler insulation, crawl space ACM 05 - 221 Mac	30% Chrysotile-Cement Pipe 5% Crocidolite-Cement Pipe
246076	12x12 tile front entrance ACM 07 - 221 Mac	7% Chrysotile-Floor Tile None Detected-Tan Mastic
246077	Linoleum surface layer, kitchen ACM 08 - 221 Mac	None Detected-Sheet Flooring None Detected-Tan Mastic

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be the client's and recipients sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Inuvik Hazmat	AMEC Job No. :	TV147020
Project :	221 Mackenzie	Report Date :	2/5/2016
Client Project No.:	N/A	Sample Date :	01/21/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 2/ 4/2016, twenty-two (22) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246078	Plaster back entrance ACM 09 - 221 Mac	3% Chrysotile-Plaster
246079	Plaster dining room ACM 10 - 221 Mac	None Detected-Plaster
246080	Plaster lower level bedroom ACM 11 - 221 Mac	3% Chrysotile-Plaster
246081	Plaster living room ACM 12 - 221 Mac	10% Chrysotile-Plaster
246082	Plaster staircase ACM 13 - 221 Mac	2% Chrysotile-Plaster
246083	Plaster bedroom 1 ACM 14 - 221 Mac	None Detected-Plaster
246084	Linoleum at surface bathroom ACM 15 - 221 Mac	None Detected-Sheet Flooring

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Inuvik Hazmat	AMEC Job No. :	TV147020
Project :	221 Mackenzie	Report Date :	2/5/2016
Client Project No.:	N/A	Sample Date :	01/21/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

On 2/ 4/2016, twenty-two (22) bulk material samples were submitted by Paul Houle for asbestos analysis by PLM/DS.

Lab Sample No.	Sample Description / Location	Asbestos Content
246085	Linoleum, 2nd layer bathroom ACM 16 - 221 Mac	25% Chrysotile-Sheet Flooring None Detected-Tan Mastic
246086	9x9 tile, below subfloor bathroom ACM 17 - 221 Mac	None Detected-Floor Tile None Detected-Felt None Detected-Tan Mastic
246087	Plaster bedroom 2 ACM 18 - 221 Mac	3% Chrysotile-Plaster
246088	Vermiculite attic ACM 19 - 221 Mac	-Actinolite Present
246089	Vermiculite attic ACM 20 - 221 Mac	-Actinolite Present
246090	Vermiculite attic ACM 21 - 221 Mac	-Actinolite Present
246091	Plaster	None Detected-Plaster
246092	Plaster	3% Chrysotile-Plaster

These samples were analyzed by layers. The first percentage is the overall asbestos content for the sample. Specific layer or component asbestos content is indicated when relevant. These reports may not be reproduced except in full. Any unauthorized use or distribution of these reports shall be the client's and recipients sole risk and without liability to Amec Foster Wheeler Environment & Infrastructure, Inc.

PLM REPORT SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Hwy
Atlanta, GA 30324 (404) 873-4761

NVLAP Lab Code 101066-0
TDH License No. 300433

Client :	Inuvik Hazmat	AMEC Job No. :	TV147020
Project :	221 Mackenzie	Report Date :	2/5/2016
Client Project No.:	N/A	Sample Date :	01/21/2016
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA 600/M4-82-020 / EPA Method 600/R-93/116		

STATEMENT OF LABORATORY ACCREDITATION

These samples were analyzed at the Atlanta Branch of Amec Foster Wheeler Environment & Infrastructure, Inc. in the Asbestos Laboratory at 2677 Buford Hwy, Atlanta, GA, 30324. The laboratory holds accreditation from the National Institute of Standards and Technology (formerly National Bureau of Standards) under the National Voluntary Laboratory Accreditation Program (NVLAP). This laboratory also is licensed and authorized to perform as an Asbestos Laboratory in the State of Texas within the purview of Texas Occupations Code, chapter 1954, so long as this license is not suspended or revoked and is renewed according to the rules adopted by the Texas Board of Health.

The samples were analyzed by polarized light microscopy in general accordance with the procedures described in the Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116. The results of each bulk sample analysis relate only to the material tested. This report shall not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

Specific questions concerning bulk sample results shall be directed to the PLM Laboratory Manager.

Analyst : James Findlay

PLM Laboratory Manager : Tom D. Morrison

Approved Signatory 

NVLAP
LAB CODE 101066-0

Final Analytical Report

Attention: Paul Houle

Amec Foster Wheeler Environment & Infrastructure
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Results for File: EC-70518

Project Number: TV147020
Project Name: Inuvik HazMat

Date Received: 2016/01/28
Date of Report: 2016/02/08

Report reviewed by:

Jesse Dang, B.Sc.
Manager
Laboratory Services

Kristine Connor
Director of QA/QC
Laboratory Services

** All samples will be disposed of after 30 days following analysis. Please contact the lab if you require additional sample storage time. (Samples deemed hazardous will be returned to the client at their own expense or disposal will be arranged.) **

Paint Analysis

Project No. TV147020

Final
File No. EC-70518

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1571 PB01 - 221 Mackenzie 2016/01/21 8:00	16-1571-D PB01 - 221 Mackenzie Lab Duplicate	16-1572 PB02 - 221 Mackenzie 2016/01/21 8:15	16-1573 PB03 - 221 Mackenzie 2016/01/21 8:25
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	15600	15600	28500	34400
LL	2016/01/29	Lead	%	Calc	0.0010	1.561	1.565	2.851	3.435

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1574 PB04 - 221 Mackenzie 2016/01/21 8:40	16-1575 PB05 - 221 Mackenzie 2016/01/21 14:00	16-1576 PB06 - 221 Mackenzie 2016/01/21 14:30	16-1577 PB07 - 221 Mackenzie 2016/01/21 14:40
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	125000	1190	479	795
LL	2016/01/29	Lead	%	Calc	0.0010	12.45	0.1188	0.0479	0.0795

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1578 PB08 - 221 Mackenzie 2016/01/21 14:50	16-1579 PB09 - 221 Mackenzie 2016/01/21 15:00	16-1580 Dup02 - 221 Mackenzie 2016/01/21 15:15	16-1581 TCLP28 - 221 Mackenzie 2016/01/21 15:25
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	---	---	---	19.1
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	462	370	442	---
LL	2016/01/29	Lead	%	Calc	0.0010	0.0462	0.0370	0.0442	---

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1582 TCLP29 - 221 Mackenzie 2016/01/21 15:35	16-1583 TCLP30 - 221 Mackenzie 2016/01/21 15:50	16-1584 TCLP31 - 221 Mackenzie 2016/01/21 16:10	16-1585 TCLP32 - 221 Mackenzie 2016/01/21 16:30
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	4.53	0.112	0.078	0.169

Quality Control Standard

Project No. TV147020 File No. EC-70518

Paint Analysis

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Analyzed Value	Advisory Range	Target Value	Reference No.
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.215	0.188-0.455	0.321	ERA D079-544
TY	2016/02/01	Lead	µg/g (ppm)	EPA 3050/6010	93	75-125	100	Metal-1

Analytical Comments

Project No. TV147020 File No. EC-70518

All Analytical results pertain to samples analyzed as received.

DL - Detection Limit

EPA: U.S. Environmental Protection Agency. 1997. Test Methods of Evaluation of Solid Waste 3rd Ed through Update III. Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

DESIGNATED SUBSTANCES SURVEY

Warehouse #3
72 Franklin Avenue
Inuvik, Northwest Territories

Submitted to:

Mr. Mike Molinski

Public Works Government Services Canada
100-167 Lombard Avenue
Winnipeg, Manitoba R3S 0T6

Submitted by:

Amec Foster Wheeler
Environment & Infrastructure
A Division of Amec Foster Wheeler Americas Limited
440 Dovercourt Drive
Winnipeg, Manitoba R3Y 1N4
204-488-2997

22 February 2016

Amec Foster Wheeler Project No. TV147020

EXECUTIVE SUMMARY

Public Works and Government Services Canada (PWGSC) retained Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler) to conduct a designated substances survey (DSS) of the industrial storage building (Warehouse #3) located at 72 Franklin Road, Inuvik, Northwest Territories (the 'Site'). The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and the warehouse.

The purpose of the survey was to assess the building for the presence of specific hazardous substances; namely potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing equipment, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs) in light ballasts, silica, suspect visible mould growth (SVG) and toxic characteristic leaching procedure (TCLP) testing for lead.

At the time of the Site inspection, the property was developed as an industrial storage building. The building was reported by PWGSC to have been constructed in the 1960s and was scheduled for demolition.

Amec Foster Wheeler did not identify ACMs as defined in this report. ACMs may be present in forms that were not observed or sampled during the Site inspection or in areas that were not accessible at the time of the survey.

Amec Foster Wheeler identified several LCP surface coatings which may be affected by building renovation or demolition activities. LCP was confirmed in exterior paints on the wood siding, exterior doors and the deck. All three of the samples collected were above the total lead content for disposal at a regular landfill with two of the samples also having TCLP lead concentration exceeding the applicable regulatory value and thus considered hazardous waste for the purposes of disposal.

Ballasts in the light fixtures stored in the building were observed to be non-PCB containing. Amec Foster Wheeler considers it good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed. All PCB-containing ballasts, known or assumed, must be stored and transported in accordance with applicable Territorial and Federal hazardous waste and transportation of dangerous goods legislation

Amec Foster Wheeler did not observe mercury containing thermostats at the Site. Fluorescent lamp tubes observed stored in the building are suspected of containing mercury. Prior to demolition activities, all mercury-containing equipment must be removed and disposed of in accordance with regulatory requirements. It is considered good practice to recycle the lamps and recover the mercury where possible.

No equipment suspected of containing ODSs was observed. Amec Foster Wheeler recommends that all equipment with ODS be removed prior to demolition. Equipment with ODS must be handled and decommissioned by a licensed technician in accordance with Federal and Territorial regulations.

Further discussion of the identified designated substances and recommendations are provided in the body of this report.

TABLE OF CONTENTS

EXECUTIVE SUMMARY ..... **i**

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE **1**

1.1 SCOPE OF WORK 1

2.0 DESCRIPTION OF SITE **1**

3.0 SURVEY RESULTS **2**

3.1 ASBESTOS-CONTAINING MATERIALS 2
3.2 LEAD AND LEAD-CONTAINING PAINT 3
3.3 MERCURY CONTAINING DEVICES 3
3.4 OZONE DEPLETING SUBSTANCES 3
3.5 POLYCHLORINATED BIPHENYLS 4
3.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE 4

4.0 RECOMMENDATIONS FOR FUTURE DEMOLITION **4**

4.1 ASBESTOS-CONTAINING MATERIALS 4
4.2 LEAD AND LEAD CONTAINING 4
4.3 MERCURY CONTAINING DEVICES 5
4.4 OZONE DEPLETING SUBSTANCE 5
4.5 POLYCHLORINATED BIPHENYLS 5
4.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE 6
4.7 OTHER RECOMMENDATIONS 6
4.8 GENERAL WORKER PROTECTION 6

5.0 SURVEY LIMITATIONS **6**

6.0 CLOSURE **7**

LIST OF APPENDICES

Appendix A Survey Definitions and Methodology
Appendix B Sampling Summary Tables
Appendix C Site Photographs
Appendix D Laboratory Certificates of Analyses

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler), was retained by Public Works and Government Services Canada (PWGSC) to conduct a designated substances survey of the existing industrial storage building (Warehouse #3) located at 72 Franklin Road, in Inuvik, NT (the 'Site'). The Site is a single storey warehouse constructed on wooden piles.

Amec Foster Wheeler understands that the purpose of the survey was to assess the structure for the presence of specific designated substances (DS) that may require special handling prior to renovation or demolition activities. Specific DS to be surveyed for included potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing devices, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs), and suspect visible mould growth (SVG). Based on the PWGSC Terms of Reference (TOR) the building is scheduled for demolition and has included demolition requirements in the findings of the report as appropriate.

The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and the warehouse.

1.1 SCOPE OF WORK

As stipulated in Amec Foster Wheeler's proposal dated 21 December 2015, the proposed scope of work was to include the following activities. The scope of work encompassed the completion of the following tasks for eight residential and two industrial buildings, each located in Inuvik, Northwest Territories.

- Conduct a DS survey of existing structure, including field and laboratory testing to confirm the presence/absence of materials of concern;
- Where reasonable within the context of the project budget and scope, provide quantities of DS associated with the building structure; and
- Prepare a DSS report for each individual structure.

Amec Foster Wheeler completed the above tasks for accessible areas within the subject building. A detailed summary of Amec Foster Wheeler's sampling methodology and definitions associated with the designated substances of concern are provided in Appendix A.

Amec Foster Wheeler completed the field assessment portion of the above scope of work on 20 January 2016.

2.0 DESCRIPTION OF SITE

At the time of the Site inspection, the property was developed as a single storey, industrial storage building (Warehouse #3). The building was constructed on piles with an elevated floor. The crawlspace below the building was not enclosed. The building was vacant at the time of the Site visit. The building was reported by PWGSC to have been constructed in the 1960s.

The general Site construction details were as follows:

Exterior Walls:	The exterior walls of the building were observed to be painted wood siding.
Roof:	The roof was observed to be pitched and finished with asphalt shingles. Observation of the roof was limited due to heavy snow cover. A fibreglass insulated attic space was present and observed.
Interior Walls:	Interior walls consisted of bare plywood.
Floor:	The flooring consisted of plywood with traces of paint.
Interior Ceilings:	The ceilings consisted of bare plywood.
Lighting:	Lighting was incandescent bulbs.
Mechanical:	There were no heating or cooling systems observed in the building.

Site photographs taken at the time of the site visit are provided in Appendix C.

3.0 SURVEY RESULTS

Ms. Karen Fortin and Mr. Mark Miller of Amec Foster Wheeler coordinated site inspection activities with Mr. Wally Ballas of PWGSC (Inuvik) who provided access and Site information for each of the structures.

Amec Foster Wheeler conducted a visual assessment of all accessible areas of the building as outlined in Appendix A: Survey Definitions and Methodology. Photographs showing the Site condition and sample locations are provided in Appendix C

3.1 ASBESTOS-CONTAINING MATERIALS

During the survey of the Site, Amec Foster Wheeler collected samples of suspect ACMs which were submitted to EMC Labs Inc. laboratory in Phoenix, Arizona for confirmatory laboratory analysis. A total of three samples of two separate building materials were collected and submitted for analysis. The results of Amec Foster Wheeler's ACM sampling activities are summarized in Tables 1 Appendix B, digital photographs of representative sampled materials are included in Appendix C, and the laboratory certificates of analysis are included in Appendix D.

Based on Amec Foster Wheeler's observations and testing, no ACMs were identified at the Site.

ACMs may be present in forms that were not observed or sampled during the Site inspection including, but not limited to, caulking, fire rated doors, thermal insulating materials such as gaskets associated with mechanical equipment, wiring and electrical components, packing associated with cast iron pipe joints, or in areas that were not accessible at the time of the survey.
There were a number of other suspect ACMs present in the building that were sampled and, based on the laboratory testing undertaken, are considered to be non-ACMs including shingles and building paper observed in the attic. These materials are listed in Table 1, Appendix B.

3.2 LEAD AND LEAD-CONTAINING PAINT

Based on the date of original building construction, there is a potential that LCP and other lead containing materials may have been used during construction of the original building or subsequent renovations. Amec Foster Wheeler submitted three samples of paint (samples PB-01, PB-02 and PB-03) for laboratory analysis. At the discretion of the assessor, sampled items included representative exterior walls, exterior doors, and an exterior deck. As explained in the report methodology, the sampling program considered typical paint coatings and not all surfaces were tested and mechanical equipment was not sampled. The samples were submitted to Amec Foster Wheeler's laboratory in Edmonton, Alberta for analysis of total lead content. The total lead concentration of the paint samples ranged from 2,060 mg/kg (parts per million) to 15,000 mg/kg (ppm). The highest total lead concentration was determined to be 15,000 mg/kg (ppm) from the blue paint sample (PB-02) recovered from the exterior wood siding.

As discussed in the Methodology Section, surface coatings with a lead content greater than 0.06% by weight (600 mg/kg) are considered to be LCPs for the purposes of this report. Laboratory results show that all three samples collected are considered to be LCP.

Amec Foster Wheeler also submitted two of the above samples for further TCLP analysis based on the total lead content. According to the *Guideline for Industrial Waste Discharges* in the Northwest Territories, the maximum allowable lead content in leachate from demolition debris is 5.0 milligrams per liter (mg/L). The TCLP samples collected by Amec Foster Wheeler were 8.40 mg/L for sample TCLP 20 (paint on the exterior double doors) and 9.84 mg/L for sample TCLP 22 (the paint on the exterior siding), both above the maximum allowable lead content for solid waste.
Results of the laboratory analyses are summarized in Table 3 (Appendix B), digital photographs of the sample locations are included in Appendix C, and the Laboratory's Certificates of Analyses are included in Appendix D.

Based on the visual survey of the building, other products on-Site that may contain lead include cable coverings and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials.

3.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler did not observe mercury-containing thermostats within the Site. Other potential mercury containing equipment include switches and thermostats associated with the building mechanical systems, however Amec Foster Wheeler did not observe any such equipment at the Site.

Fluorescent lamp tubes observed stored in the building are suspected of containing mercury. Based on current literature the fluorescent lamps observed in the building are suspected of containing between 4 and 12 mg of mercury (see Appendix A). The number of potentially mercury containing bulbs was not determined.

3.4 OZONE DEPLETING SUBSTANCES

Amec Foster Wheeler did not observe ozone depleting substances in the Site.

All equipment suspected of containing ODSs should be inspected by a qualified technician prior to removal or disposal and if found to contain ODS, the unit must be decommissioned in accordance with federal and Territorial regulations.

3.5 POLYCHLORINATED BIPHENYLS

The light fixtures used throughout the site were incandescent bulbs. Fluorescent light fixtures stored in the Site appeared to be the same style and age. Amec Foster Wheeler inspected two ballasts which were labelled as "No PCB".

Amec Foster Wheeler submitted two samples of paint (samples PCB-01 and PCB-02) for laboratory PCB analysis. Painted surfaces sampled included representative exterior walls and exterior doors. The samples were submitted to Amec Foster Wheeler's laboratory in Edmonton, Alberta for analysis of PCB content. No PCBs were detected in the samples submitted.

3.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE

Amec Foster Wheeler did not observe SVG or water damage on Site. SVG may be present within enclosed spaces and may have not been evident during the Site visit.

4.0 RECOMMENDATIONS

The demolition recommendations for the materials identified in the building are provided below. It is assumed that all work will be completed on the vacant building in an area restricted to the public. All demolition activities shall be carried out in accordance with CSA standard S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures, the National Building Code Section 8 (Safety Measures at Construction and Demolition Sites) and other related sections.

All work shall be completed by qualified workers following written safe work procedures, in accordance with requirements of the General Safety Regulation, under the Northwest Territories Safety Act.

4.1 ASBESTOS-CONTAINING MATERIALS

No ACMs were identified at the Site.

As previously stated, ACMs may be present in forms that were not observed or sampled during the Site inspection including, but not limited to, caulking, fire rated doors, thermal insulating materials such as gaskets associated with mechanical equipment, wiring and electrical components, or other materials in areas that were not accessible at the time of the survey. For the purpose of renovation, demolition, or any other alteration or disturbance, all suspect ACMs, unless confirmed through sampling and analysis, should be considered to contain asbestos and handled in accordance with a written work plan that references current Territorial guidelines as presented in the *Northwest Territories & Nunavut Code of Practice on Asbestos Abatement"* (2012).

4.2 LEAD AND LEAD CONTAINING

Amec Foster Wheeler identified three LCP surface coatings which will be affected by building demolition activities. LCP was confirmed in painted surfaces including exterior wooden siding,

exterior doors and the exterior deck. These are not suitable for disposal at a landfill in the Northwest Territories and a suitable disposal location will need to be identified.

Two TCLP samples collected by Amec Foster Wheeler were above the maximum allowable lead leachate concentration for demolition debris. The exterior doors coated in grey paint and sub-layers, and exterior siding coated in light blue paint and sub-layers are not suitable for disposal at a landfill in the Northwest Territories and will need to be considered as hazardous waste for disposal. It is anticipated that the LCP coated building materials would be disposed as one unit rather than the LCP removed.

Any remaining demolition debris is expected to be disposed of at most construction landfills without restriction, however this should be confirmed with the landfill receiving the demolition waste prior to demolishing the building so that any requirements for special handling or disposal can be determined and suitable arrangement made.

Based on the visual survey of the building, other products on-Site that may contain lead include cable coverings and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials.

All workers who may be exposed to lead must undergo hazard specific awareness training. All workers who may be performing activities that may create airborne lead dust, such as grinding, cutting, sandblasting or welding, should wear personal protective equipment including appropriate respiratory equipment, dermal protection and disposable coveralls. As lead containing paint poses a greater concern when heated, such as during welding operations, it is considered good practice to remove lead containing paint from surfaces to be welded or otherwise heated. Workers should also follow appropriate decontamination procedures prior to leaving the work area.

4.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler did not observe mercury-containing thermostats or other equipment on Site. The presence of mercury in fluorescent lamps and thermostats poses minimal risks to occupants or workers provided the equipment is handled properly and the mercury is not allowed to escape. Prior to demolition activities the fluorescent lamps should be relocated, recycled or disposed. It is considered good practice to recycle the lamps and recover the mercury where possible.

4.4 OZONE DEPLETING SUBSTANCE

There was no equipment suspected to contain an ODS observed on the Site. Any suspect equipment discovered during demolition/renovation, should be inspected for the presence of ODSs and handled or disposed of in accordance with current Federal and Territorial regulations which shall be completed by trained and qualified technicians.

4.5 POLYCHLORINATED BIPHENYLS

Several fluorescent light fixtures were observed being stored on Site. The ballasts were labelled to be non-PCB containing. It is considered good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed. If ‘non-PCB’ or ‘No PCBs’ labelling is not found on the ballasts, the ballasts should be compared to information obtained

from the manufacture to determine PCB content. If the PCB content of the ballast cannot be determined, the ballast should be assumed to contain PCBs unless laboratory testing indicates otherwise. All PCB-containing ballasts, known or assumed, must be stored and transported in accordance with applicable Territorial and Federal hazardous waste and transportation of dangerous goods legislation

Amec Foster Wheeler completed a limited PCB in paint assessment. Two samples of suspect paint were collected. No PCBs were detected in the samples submitted.

4.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE

Amec Foster Wheeler did not observe any suspect visible growth (SVG) or water damage on Site. SVG may be present within enclosed spaces and may have not been evident during the Site visit.

4.7 OTHER RECOMMENDATIONS

It is recommended that all work be conducted in accordance with a Site specific demolition plan which should address such items as abatement, demolition methods, worker training and protection, decontamination procedures, dust suppression, and transportation and disposal of waste. It is expected that the demolition contractor will prepare such documents based on direction provided in project specification documents which are to be developed at a later date.

4.8 GENERAL WORKER PROTECTION

The presence of damaged paint coatings has been identified at the Site. Amec Foster Wheeler recommends that any areas where damaged hazardous materials are present which may pose a worker exposure issue, be isolated and the area restricted to knowledgeable workers with appropriate personal protection equipment. Given that the Site is partially vacant and minimum maintenance is expected, the Site conditions are subject to change.

5.0 SURVEY LIMITATIONS

Within the limitations of the agreed-upon scope of work, the field observations, measurements and analysis are considered sufficient to provide an overview of existing potential concerns or form a general inventory of hazardous materials in the subject area of the building. It should be noted that the data presented herein were collected at specific sampling locations, and depending on the homogeneity of the samples, the data may vary between these locations. Some inherent limitations exist as to the thoroughness of this assessment due to the nature of building construction. For example it may not practical to test all pipe insulation for asbestos content at the Site due to the amount and locations and being located under existing materials. Some reasonable extrapolation (e.g., sampling of similar materials) was required from the findings of the assessment.

Reasonable efforts were made to identify all substances designated in this report; however, Amec Foster Wheeler may not have been able to identify and assess all suspect designated substances, as certain building materials may exist that were not visible or accessible at the time of the survey. Inaccessible locations include those that require demolition to gain entry, which present an unacceptable health or safety risk to the surveyors, and where entry is

prohibited by security or other institutional restrictions. Areas above a suspended tile ceiling, crawl spaces, pipe chases and service tunnels, and areas behind an access hatch were considered accessible. Materials hidden by walls, finishes and equipment at the time of the survey were considered inaccessible.

The field observations, measurements and analysis are considered sufficient to form a general inventory of hazardous materials in the surveyed areas. It is possible that materials may exist which could not be reasonably identified within the scope of the assessment or which were not apparent or accessible during the Site visit. Within the limitations of the agreed-upon scope of work, the survey included building materials found within or forming part of the building envelope and building mechanical systems and equipment. The inspection did not include the identification of suspected hazardous materials located in the interior of electrical, mechanical (i.e. interior surfaces of ventilation ducting, boilers, etc.), or process manufacturing equipment, inside wall cavities (e.g., pipe chases), inaccessible ceiling plenums, sub floors, underlying materials (e.g., underlying flooring and paint layers), and where sampling could have affected the integrity of the system (e.g., water-proof roof membrane and caulking). Amec Foster Wheeler is not responsible for the repairs of building materials that were sampled during the survey.

This assessment has been undertaken and performed in a professional manner in accordance with generally accepted practices, using the degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. The findings of this report are based solely on the conditions of the Site encountered at the time of the Site visit on 20 January 2016, and are limited by the availability of information at the time of the survey. Due to physical limitations inherent to this work, Amec Foster Wheeler expressly does not warrant that the Site is free of designated substances or that all designated substances have been identified. It is possible that materials exist which could not be reasonably identified within the scope of the survey or which were not apparent or accessible during the site visit. No other warranties, expressed or implied, are made.

6.0 CLOSURE

This report was prepared for the exclusive use of Public Works and Government Services Canada and is intended to provide an overview of existing potential concerns within the specified work area at the time of the Site visit. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Amec Foster Wheeler is required. With respect to third parties, Amec Foster Wheeler has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

Amec Foster Wheeler has prepared this report for the express use of Public Works and Government Services Canada and may be relied upon by Public Works and Government Services Canada. No other person or organization is entitled to rely upon any part of this report without the prior written consent of Amec Foster Wheeler. Public Works and Government Services Canada may release all or part(s) of this report to third parties; however, such third party in using this report agrees that it shall have no legal recourse against Amec Foster Wheeler or its

subsidiaries, and shall indemnify and defend Amec Foster Wheeler or its subsidiaries from and against all claims arising out of or in conjunction with such use or reliance.

This report does not constitute legal advice. Amec Foster Wheeler makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel. In addition, Amec Foster Wheeler makes no determination or recommendation regarding the decision to purchase, sell or provide financing for this property.

This report presents an overview of issues of concern with the specified substances, reflecting Amec Foster Wheeler's best judgment using information reasonably available at the time of Amec Foster Wheeler's evaluation / survey. In preparing this report, Amec Foster Wheeler has relied upon certain information and representations provided by others. Amec Foster Wheeler did not attempt to independently verify the accuracy or completeness of that information. To the extent that the conclusions in this report are based in whole or in part on such information, those conclusions are contingent on its accuracy and validity. Amec Foster Wheeler assumes no responsibility for any consequence arising from any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to Amec Foster Wheeler.

This Report is subject to the contractual project agreement.

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

Respectfully,
Amec Foster Wheeler Environment & Infrastructure,
a Division of Amec Foster Wheeler Americas Limited,

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APPENDIX A
SURVEY DEFINITIONS AND METHODOLOGY

SURVEY DEFINITIONS, METHODOLOGY AND REGULATORY REQUIREMENTS

1.0 FIELD METHODOLOGY

The survey generally consisted of a room-by-room survey of all accessible areas within the buildings surveyed. The surveyor identified potential designated substances by appearance, age, and knowledge of current and historical uses of the Site and subject materials. Accessible locations are those for which entry is not prohibited by security or other institutional restrictions, that could be inspected without the need for destructive testing (e.g. penetration of a surface such as a wall, ceiling chase or shaft to gain access), and which did present an unacceptable health or safety risk to the surveyor. The area above a suspended tile ceiling, crawlspaces, pipe chases / service tunnels or behind an access hatch was generally considered to not be accessible. Materials hidden by walls, finishes and equipment at the time of the survey are considered inaccessible. Reasonable effort was used to identify potential designated substances in areas not readily accessible, such as confined areas enclosed by gypsum board, plaster, or panelling, etc., or where minor demolition was required to gain entry.

Intrusive sampling may have been conducted in the form of collecting samples of pipe insulation and other building materials, removing baseboards, lifting areas of carpet or flooring and cutting or breaking small holes in wallboard or plaster. Amec Foster Wheeler only performed such activities in areas where operation of the facility and the health and safety of occupants was affected. Effort was made to minimize or conceal damage. Amec Foster Wheeler was not responsible for the repair of any other areas sampled as part of this evaluation with the exception of temporary repairs to leave area in safe workplace condition.

While in the field, the surveyor completed a detailed checklist or collected detailed field notes for the building; a description of the rooms and a detailed description of any suspected designated substances observed within the rooms. Details of condition, visibility / accessibility, and any action that may be required to reduce asbestos fibre or other designated substances exposure hazards based on these observations were also recorded.

2.0 ASBESTOS-CONTAINING MATERIALS

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

The WSCC Asbestos Abatement Code of Practice states: “If asbestos-containing materials are identified and there is the potential for exposure, corrective action is required.” The Code of Practice also recommends considering the location, condition, function and cost prior to following the four basic approaches to controlling exposure: removal, encapsulation, enclosure and a management plan. The Code of Practice includes information on the techniques for the identification, safe abatement of asbestos-containing materials, and information on asbestos products, health hazards, worker protection, safe work procedures, inspection criteria,

applicable legislation and competency for those involved in abatement activities. This Code was adopted from the Alberta Asbestos Abatement Manual (2011).

In Northwest Territories, the *Occupational Health and Safety Regulations, Part 24* defines "asbestos" as a manufactured article or other material which contains 1% or more asbestos by weight either at the time of manufacture, or as determined by the following method:

- NIOSH Method 9002, as amended from time to time, from the NIOSH Manual of Analytical Methods, 4th Edition, published by the National Institute for Occupational Safety and Health, United States.

Friable material refers to an ACM that can be readily crumbled using hand pressure, separating asbestos fibres from the binding materials with which they are associated. Typical friable materials include acoustical or decorative spray applications, fireproofing, refractory and thermal insulation.

Non-friable material refers to an ACM that is associated with a binding agent (such as tar or cement) that prevents the ready release of airborne fibres. Typical non-friable materials include floor tiles, fire blankets, pre-formed manufactured cementitious insulation and wallboards, pipes, and siding. These materials are generally considered to pose a low hazard provided they remain intact and are not cut or shaped with power tools that are not equipped with a HEPA filtered dust collection system.

Amec Foster Wheeler collected samples of suspected ACMs and submitted them to EMC Labs Inc. (EMC) laboratory in Phoenix, Arizona and Amec Foster Wheeler's lab in Atlanta, Georgia for analysis. Both are National Voluntary Laboratory Accreditation Program (NVLAP) certified laboratories. The samples were analyzed using Polarized Light Microscopy (PLM) methods (EPA 600/R-93/116).

3.0 LEAD and LEAD CONTAINING PAINT

In building construction, lead was frequently used for roofs, cornices, tank linings, electrical conduits, and as a main component of soft solder ally used to seal pipe joints. Lead was also used extensively for pigmentation, sealing, and as a drying agent in oil based paints up until the early 1950's. Exterior paints typically contained up to 60% lead by weight.

In 1976, the Canadian Federal Government introduced the Liquid Coating Materials Regulations under the Federal Hazardous Products Act, restricting the maximum total lead content of paints and other liquid coating materials used in or around premises attended by children or pregnant women to 0.5% by weight (5000 mg/kg). In January 1991, Health Canada negotiated a voluntary reduction of lead content in all Canadian produced consumer paint to a maximum of 0.06%. Recently the Canadian Federal Government enacted the Surface Coating Materials Regulations which reduce the maximum total lead content of any new surface coatings for consumer products to 0.009% (90 mg/kg). This reduction does not generally apply to surface coating applied to buildings or other structures used for agricultural or industrial purposes or as an anti-weathering or anti-corrosive coating.

Northwest Territories *Environmental Protection Act* (EPA) considers a lead containing paint as any structural coating containing greater than 0.06% by weight (600 mg/kg). Surface coatings containing 600 mg/kg or 0.06% lead would be considered to represent a higher risk of exposure

to workers if disturbed during demolition activities. Removal or disturbance of paint coatings exceeding this concentration would require abatement or implementation of appropriate lead dust controls.

The *Guideline for the General Management of Hazardous Waste* describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste lead and lead paint debris. According to the *Guideline for Industrial Waste Discharges in the NT*, the maximum allowable lead content in leachate from solid waste including demolition debris is 5.0 milligrams per liter (mg/L).

In the preparation of this report, Amec Foster Wheeler consulted with Government of the Northwest Territories Environment Division who indicated that the current guidelines are under revision but are still to be followed. They further confirmed that any LCP (greater 600 mg/kg total or greater than 5.0 mg/kg TCLP) are not suitable for disposal at landfills in the Northwest Territories.

The survey included a description of typical building materials suspected to contain lead. Details of location, description, and condition were recorded. The survey included the collection of select bulk samples of readily accessible building materials suspected to contain a surface coating defined as a LCP. Paint chip samples were analyzed in accordance with U.S. EPA SW 846 3050 6010C for lead.

4.0 MERCURY

As part of the survey, Amec Foster Wheeler checked for such items as mercury containing thermostats, switches and lamps. Based on information provided by the U.S. Environmental Protection Agency (EPA), small commercial switches and thermostats may contain 2 to 18 mg of mercury with industrial switches and equipment containing 5 kg or more. According to published literature, older mercury containing lamps, the bulk of which are four foot T-12 fluorescent lamps, can contain up to 80 mg of mercury per lamp. Newer T-12, T-8 and T-5 style fluorescent lamps manufactured since 2000 have in the order of 3 to 12 mg of mercury per lamp. Other types of lamps, such as metal halide and high pressure sodium, can also contain mercury in the order of 20 to 250 mg/lamp.

The Canadian Council of Ministers of the Environment (CCME) *"Canada-Wide Standard for Mercury Containing Lamps"* (2001) is largely geared towards reducing the amount of mercury in lamps at the manufacturing stage; however they do recommend that the release of mercury can be minimized through the proper recycling and disposal of mercury containing lamps.

The *Guideline for the General Management of Hazardous Waste* describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste mercury. According to the Guideline for Industrial Waste Discharges in the NT, the maximum allowable mercury content in leachate from solid waste is 0.1 milligrams per liter (mg/L). The *Guide to Recycling Mercury-Containing Lamps* states that "*testing done in the NWT has confirmed that crushed mercury-containing lamps may not pass the leacheate test and therefore, are managed as hazardous waste*". Waste management and transfer of designated

substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

5.0 POLYCHLORINATED BIPHENYL (PCB)

PCB-containing products were manufactured for use in applications where stable, fire-resistant, and heat-transfer properties were demanded between 1926-29 and 1977. Most PCBs were sold for use as dielectric fluids (insulating liquids) in electric transformers and capacitors. Other uses included heat transfer fluid, hydraulic fluid, dye carriers in carbonless copy paper, plasticizers in paints, adhesives, and caulking compounds. In Canada, PCBs were prohibited from being used in products, equipment, machinery, electrical transformers and capacitors that were manufactured or imported into the country after July 1980. However, older equipment in use after this date may still contain PCBs if the equipment's fluid has not been changed, or if there was sufficient inventory of such equipment.

As part of the survey, Amec Foster Wheeler assessed the Site for the presence of potential PCB-containing materials. Potential PCB-containing equipment or materials were identified by appearance, age and knowledge of current and historical uses of the Site and subject materials. The possible presence of PCBs in the fluorescent or other lamp ballasts was determined based on a visual assessment and the 1991 Environment Canada document entitled "*Identification of Lamp Ballasts Containing PCBs*." Light fixtures were characterized by type and a representative number of fixtures were examined in each functional area of the building, where accessible. Suspect electrical equipment including lighting ballasts was examined, where accessible.

There is a lack of clear Provincial / Territorial / Federal Regulatory framework to provide guidance on PCBs in building construction materials, particularly with respect to non-typical materials such as surface coatings and building materials. The regulations pertaining to PCBs are more related to liquids associated to electrical equipment and contaminated materials as opposed to PCBs in construction materials. The threshold for solid waste process residuals suitable for landfill as listed in the Guideline for Industrial Waste Discharges in the NWT is 50 mg/L by mass. Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

PCBs are also regulated under the Federal Canadian Environmental Protection Act, 1999, PCB Regulation SOR/2008-273 which came into force September 2008 and subsequent amendment regulation SOR 2010-57; (http://www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=105). The Federal PCB regulations generally establish deadlines for ending the use and long term storage of PCBs and products containing PCBs. PCB-containing equipment or any PCB-containing substance with a PCB concentration at or in excess of 2 ppm for liquids and 50 ppm for solids (which pertain to applied surface coatings such as paint) are subject to the above Federal regulations.

Select paint samples were submitted for PCB analysis. Paint samples analysed were determined based on general industry literature which indicated industrial paint coatings exhibiting elastomeric properties or durable paints may contain PCBs. Such coatings may be applied to or used as floor markings, exterior doors, railings and concrete surfaces. Paint samples were randomly selected to get a general representation of the building surveyed. Paint samples were analysed by Amec Foster Wheeler's Edmonton Laboratory.

6.0 OZONE DEPLETING SUBSTANCES

As part of the survey, Amec Foster Wheeler checked for equipment or materials which may contain ODS such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons. Typically these ODSs may be used as refrigerants, propellants, in the manufacture of items such as packaging, insulation, solvents and halon based fire extinguishing agents.

In Canada, the production or import of CFCs were banned in January 1996. CFCs were developed in the 1930s for use as a substitute refrigerant to ammonia. While less damaging to the ozone layer, HCFCs are scheduled to be phased out in Canada between the years 2010 and 2020.

In Canada, the Federal and Provincial governments have legislation in place for ODSs. Federally, ODS is regulated under the Federal Halocarbon Regulations (SOR/2003-289 and amendment regulation SOR/2009-221; (http://ec.gc.ca/ozone/default.asp?lang=En&n=E06A6B0D-1) which are under the authority of the Federal Environmental Protection Act (1999). The purpose of the Federal Halocarbon Regulation is to regulate the use, identification, leak testing and disposal of ODSs on a Federally owned property.

7.0 MOULD

Mould spores are ubiquitous in both indoor and outdoor environments and in the presence of adequate moisture, may pose a concern in a building environment. Suspected mould growth on building materials was identified by visual growth (referred to as suspect visual mould growth; SVG) or evidence of water intrusion / damage. Based on the walk-through and observations Amec Foster Wheeler performed a walk-through visual inspection of the site for evidence of substantial moisture issues and mould reservoirs and/or amplifiers. The presence and extent of any SVG and water damage was determined using reasonable means noting that Amec Foster Wheeler may not have been able to identify all possible fungal reservoirs, as certain materials may be hidden by walls, finishes and equipment.

No samples of SVG were collected as part of the project scope of work.

There are currently no regulations specifically covering exposure to mould and/or mould remediation practices in Canada and there are no occupational exposure limits that define acceptable levels of mould exposure without adverse health effects. Direction on the assessment and remediation of mould in this report is based on the *"Mould Guidelines for the Canadian Construction Industry"* Canadian Construction Association (document CCA82). February 2004.

8.0 REGULATORY REQUIREMENTS

Sections 122.1 and 125.1 of the Canada Labour Code (R.S.C., 1985, c. L-2) and Part X of the Canada Occupational Health and Safety Regulations (SOR/86-304) address asbestos/hazardous substances in federally operated workplaces.

As per the Canada Labour Code:

- Section 122.1: “hazardous substance” includes a hazardous product and a chemical, biological or physical agent that, by reason of a property that the agent possesses, is hazardous to the safety or health of a person exposed to it.
- Section 125.1 Without restricting the generality of section 124 or limiting the duties of an employer under Section 125 but subject to any exceptions that may be prescribed, every employer shall, in respect of every work place controlled by the employer and, in respect of every work activity carried out by an employee in a workplace that is not controlled by the employer, to the extent that the employer controls the activity, (a) ensure that concentrations of hazardous substances in the work place are controlled in accordance with prescribed standards; (b) ensure that all hazardous substances in the work place are stored and handled in the manner prescribed; (c) ensure that all hazardous substances in the work place, other than hazardous products, are identified in the manner prescribed.
- Part X of the Canada Occupational Health and Safety Regulations Section 10.19 (1) states: “An employee shall be kept free from exposure to a concentration of […] (c) airborne chrysotile asbestos in excess of one fibre per cubic centimetre.”

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

Waste management and transfer of designated substances, is defined and outlined under the *Guideline for the General Management of Hazardous Waste in the NWT.*

APPENDIX B
SAMPLE SUMMARY TABLES

TABLE 1: SAMPLING INFORMATION SUMMARY – BULK ASBESTOS Materials Determined to be Non-Asbestos-Containing						
Amec Foster Wheeler Sample No.	Lab ID No.	Photo No.	Sample Location Description	Sample Description	Laboratory Results	
					% Asbestos Fibres	Asbestos Type
ACM-01	0165866-001	NA	Roof	Shingle at surface	No Asbestos fibres detected	
ACM-02	0165866-002	NA	Roof	Shingle at surface	No Asbestos fibres detected	
ACM-03	0165866-002	5	Attic	Paper, black	No Asbestos fibres detected	
				Insulation backing, yellow	No Asbestos fibres detected	

TABLE 2: LEAD LABORATORY RESULTS, TCLP ANALYSIS RESULTS				
Sample Description and Location	**Laboratory Results Total Lead (mg/kg)**	**Photo No.**	**Amec Foster Wheeler Sample No.**	**Toxicity Characteristic Leaching Procedure (TCLP) mg/L**
Grey, green, white and grey layers of paint, three sets of double exterior doors.	**12100**	7, 8	PB01 TCLP 20	**8.40**
Light blue and dark blue paint on wood siding.	**15000**	9	PB02 TCLP 22	**9.84**
Light blue and dark blue paint on front deck of warehouse.	**2060**	10	PB03	-

TABLE 3: PCB LABORATORY RESULTS				
Sample Description and Location	**Photo No.**	**Amec Foster Wheeler Sample No.**	Lab ID No	**Laboratory Results Total PCB (mg/kg)**
Grey, green, white and grey layers of paint, three sets of double exterior doors.	7, 8	PCB01	16-1500	**<0.5**
Light blue and dark blue paint on wood siding.	9	PCB02	16-1501	**<0.5**

APPENDIX C
SITE PHOTOGRAPHS

Photo 1: View of front of warehouse located at 72 Franklin Avenue in Inuvik, NT.

Photo 2: View of rear of warehouse, northwest corner.

Photo 3: Interior of warehouse, looking East towards front entrance.

Photo 4: Warehouse attic, looking West.

Photo 5: Warehouse crawl space.

Photo 6:. Sample ACM-03, warehouse attic insulation. No asbestos fibres detected.

72 Franklin, Inuvik, NT	Photo Date: January 2016	Project No.: TV147020	Figure 1

Photo 7: Samples ACM-01 and 02 – 72 Franklin, two layers of grey/black shingles on the warehouse roof. No asbestos fibres detected.

Photo 8: Sample PB01/ TCLP20 – 72 Franklin, four layers of paint on warehouse exterior doorways; grey, green, white, grey contains **12,100 mg/kg and 8.40 mg/l lead.**

Photo 9: Sample PB01 – 72 Franklin, four layers of paint on warehouse exterior doorways; grey, green, white, grey contains **12,100 mg/kg of lead.**

Photo 10: Sample PB02 – 72 Franklin, two layers of paint on warehouse exterior wood siding; light blue, dark blue contains **15,000 mg/kg of lead.**

Photo 11: Sample PB03 – 72 Franklin, two layers of paint on warehouse front deck, light blue and dark blue cotain **2,060 mg/kg of lead**.

72 Franklin, Inuvik, NT	Photo Date: January 2016	Project No.: TV147020	Figure 2

APPENDIX D
LABORATORY CERTIFICATES OF ANALYSES

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0165866

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	TV147020
Address:	440 DOVERCOURT DRIVE	Date Received:	01/29/2016
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	02/05/2016
Collected:	01/20/2016	Date Reported:	02/05/2016
Project Name:	INUVIK HAZMAT	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	KAREN FORTIN
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0165866-001 ACM-01-72 FRANKLIN	ROOF	Roof Shingle, Gray/ Black	No	None Detected	Cellulose Fiber Synthetic Fiber Carbonates Gypsum Quartz Binder/Filler	20% 5% 75%
0165866-002 ACM-02-72 FRANKLIN	ROOF	Roof Shingle, Gray/ Black	No	None Detected	Cellulose Fiber Synthetic Fiber Carbonates Gypsum Quartz Binder/Filler	20% 5% 75%
0165866-003 ACM-03-72 FRANKLIN		LAYER 1 Paper, Black	No	None Detected	Cellulose Fiber Carbonates Gypsum Binder/Filler	85% 15%
		LAYER 2 Insulation Backing, Yellow	No	None Detected	Fibrous Glass Gypsum	97% 3%

Analyst - Kurt Kettler

Signatory - Lab Manager - Ken Scheske

Final Analytical Report

Attention: Paul Houle

Amec Foster Wheeler Environment & Infrastructure
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Results for File: EC-70511

Project Number: TV147020
Project Name: Inuvik HazMat

Date Received: 2016/01/28
Date of Report: 2016/02/08

Report reviewed by:

Jesse Dang, B.Sc.
Manager
Laboratory Services

Kristine Connor
Director of QA/QC
Laboratory Services

** All samples will be disposed of after 30 days following analysis. Please contact the lab if you require additional sample storage time. (Samples deemed hazardous will be returned to the client at their own expense or disposal will be arranged.) **

Paint Analysis

Project No. TV147020

Final
File No. EC-70511

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1497 PB01 - 72 Franklin 2016/01/20 14:00	16-1498 PB02 - 72 Franklin 2016/01/20 14:30	16-1499 PB03 - 72 Franklin 2016/01/20 14:40	16-1502 TCLP20 - 72 Franklin 2016/01/20 15:15
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	---	---	---	8.40
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	12100	15000	2060	---
LL	2016/01/29	Lead	%	Calc	0.0010	1.208	1.499	0.2064	---

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1503 TCLP22 - 72 Franklin 2016/01/20 15:25
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	9.84

Paint Analysis - Polychlorinated Biphenyls

Project No. TV147020

Final
File No. EC-70511

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: Client ID: Sample Date: DL	16-1500 PCB01 - 72 Franklin 2016/01/20 14:50	16-1501 PCB02 - 72 Franklin 2016/01/20 15:00	16-1501-D PCB02 - 72 Franklin Lab Duplicate
PC	2016/01/28	PCB - Total	mg/kg (ppm)	EPA 3550/8082	0.5	< 0.5	< 0.5	< 0.5
PC	2016/01/28	Decachlorobiphenyl Surrogate Recovery	%	EPA 3550/8082	0.1	88.9	84.1	81.8
PC	2016/01/28	Tetrachloro-m-xylene Surrogate Recovery	%	EPA 3550/8082	0.1	* 171	97.3	101

Quality Control Standard

Project No. TV147020 File No. EC-70511

Paint Analysis

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Analyzed Value	Advisory Range	Target Value	Reference No.
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.215	0.188-0.455	0.321	ERA D079-544
TY	2016/02/01	Lead	µg/g (ppm)	EPA 3050/6010	93	75-125	100	Metal-1

Paint Analysis - Polychlorinated Biphenyls

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Analyzed Value	Advisory Range	Target Value	Reference No.
PC	2016/01/28	PCB - Total	ug/g(ppm)	EPA 3550/8082	13	6.30-18.0	14.8	ERA D040726

Analytical Comments

Project No. TV147020 File No. EC-70511

* Surrogate recovery results high possibly due to sample matrix interference. Results have been verified.

All Analytical results pertain to samples analyzed as received.

DL - Detection Limit

EPA: U.S. Environmental Protection Agency. 1997. Test Methods of Evaluation of Solid Waste 3rd Ed through Update III. Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

Extraction and analysis limits for holding time for Hydrocarbons were met.

DESIGNATED SUBSTANCES SURVEY

Trade Shop
74B Franklin Road
Inuvik, Northwest Territories

Submitted to:

Mr. Mike Molinski

Public Works Government Services Canada
100-167 Lombard Avenue
Winnipeg, Manitoba R3S 0T6

Submitted by:

Amec Foster Wheeler
Environment & Infrastructure
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22 February 2016

Amec Foster Wheeler Project No. TV147020

EXECUTIVE SUMMARY

Public Works and Government Services Canada (PWGSC) retained Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler) to conduct a designated substances survey (DSS) of the Trade Shop building located at 74B Franklin Road, Inuvik, Northwest Territories (the 'Site'). The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and the warehouse.

The purpose of the survey was to assess the building for the presence of specific hazardous substances; namely potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing equipment, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs) in light ballasts, silica, suspect visible mould growth (SVG) and toxic characteristic leaching procedure (TCLP) testing for lead.

At the time of the Site inspection, the property was developed as an industrial shop building. The building was reported by PWGSC to have been constructed in 1974 and scheduled for demolition.

Based on Amec Foster Wheeler's field assessment and laboratory results, identified ACMs included mechanical (pipe fitting and elbow) insulation materials throughout the building and cementitious (Transite) paneling on the south exterior wall and adjoining west interior wall. Amec Foster Wheeler recommends that identified ACMs be removed using Low and Moderate risk asbestos abatement procedures. Pipe fitting insulation materials may be removed following Moderate risk glovebag abatement procedures.

Amec Foster Wheeler identified several LCP surface coatings which may be affected by building renovation or demolition activities. LCP was confirmed in exterior paints on the main exterior door and the wooden deck structure. Two of the twelve paint samples collected were above the total lead content for disposal at a regular landfill. Six of the paint samples were submitted for TCLP analysis and were determined to be below the applicable regulatory value for lead concentration. Amec Foster Wheeler observed emergency lighting devices that are suspected to contain lead-acid batteries.

Ballasts in the fluorescent light fixtures in the building were observed to be non-PCB containing. Amec Foster Wheeler considers it good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed. All PCB-containing ballasts, known or assumed, must be stored and transported in accordance with applicable Territorial and Federal hazardous waste and transportation of dangerous goods legislation.

Amec Foster Wheeler did not observe mercury containing thermostats at the Site. Fluorescent lamp tubes observed in the building are suspected of containing mercury. Prior to demolition activities, all mercury-containing equipment must be removed and disposed of in accordance

with regulatory requirements. It is considered good practice to recycle the lamps and recover the mercury where possible.

No equipment suspected of containing ODSs was observed. Amec Foster Wheeler recommends that all equipment with ODS be removed prior to demolition. Equipment with ODS must be handled and decommissioned by a licensed technician in accordance with Federal and Territorial regulations.

Localized water damage on ceilings was observed in the northeast office and the boiler room. Substantial water damage was observed in the northeast office, the result of a burst sprinkler pipe in March 2015. It was observed that that little remediation or clean-up was Based on the observations made, it is suspected that mould growth may be present in locations that are hidden or covered. As the building is slated for demolition, mould remediation is not expected.

Further discussion of the identified designated substances and recommendations are provided in the body of this report.

TABLE OF CONTENTS

EXECUTIVE SUMMARY ..... **I**

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE **1**

1.1 SCOPE OF WORK 1

2.0 DESCRIPTION OF SITE **1**

3.0 SURVEY RESULTS **2**

3.1 ASBESTOS-CONTAINING MATERIALS 2
3.2 LEAD AND LEAD-CONTAINING PAINT 3
3.3 MERCURY CONTAINING DEVICES 4
3.4 OZONE DEPLETING SUBSTANCES 5
3.5 POLYCHLORINATED BIPHENYLS 5
3.6 SUSPECT VISUAL MOULD GROWTH AND WATER DAMAGE 5

4.0 RECOMMENDATIONS FOR FUTURE DEMOLITION **5**

4.1 ASBESTOS-CONTAINING MATERIALS 5
4.2 LEAD AND LEAD CONTAINING PAINT 6
4.3 MERCURY CONTAINING DEVICES 6
4.4 OZONE DEPLETING SUBSTANCE 7
4.5 POLYCHLORINATED BIPHENYLS 7
4.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE 7
4.7 OTHER RECOMMENDATIONS 7
4.8 GENERAL WORKER PROTECTION 7

5.0 SURVEY LIMITATIONS **8**

6.0 CLOSURE **9**

LIST OF APPENDICES

Appendix A Survey Definitions and Methodology
Appendix B Sampling Summary Tables
Appendix C Site Photographs
Appendix D Laboratory Certificates of Analyses

1.0 PROJECT BACKGROUND AND TERMS OF REFERENCE

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler), was retained by Public Works and Government Services Canada (PWGSC) to conduct a designated substances survey of the existing industrial trade shop building located at 74B Franklin Road, in Inuvik, NT (the 'Site'). The Site is a single storey trade shop structure with office areas constructed on wooden piles.

Amec Foster Wheeler understands that the purpose of the survey was to assess the structure for the presence of specific designated substances (DS) that may require special handling prior to renovation or demolition activities. Specific DS to be surveyed for included potential asbestos-containing materials (ACMs), lead and lead-containing paint (LCP), mercury containing devices, ozone depleting substances (ODSs), polychlorinated biphenyls (PCBs), and suspect visible mould growth (SVG). Amec Foster Wheeler understands that the building is scheduled for demolition and has included demolition requirements in the findings of the report as appropriate.

The DSS was part of a larger project involving designated substances surveys, structural building evaluation for demolition or repair and preparation of specifications for eight residential buildings, trade shop and the warehouse.

1.1 SCOPE OF WORK

As stipulated in Amec Foster Wheeler's proposal dated 21 December 2015, the proposed scope of work was to include the following activities. The scope of work encompassed the completion of the following tasks for eight residential and two industrial buildings, each located in Inuvik, Northwest Territories.

- Conduct a DS survey of existing structure, including field and laboratory testing to confirm the presence/absence of materials of concern;
- Where reasonable within the context of the project budget and scope, provide quantities of DS associated with the building structure; and
- Prepare a DSS report for each individual structure.

Amec Foster Wheeler completed the above tasks for accessible areas within the subject building.

A detailed summary of Amec Foster Wheeler's sampling methodology and definitions associated with the designated substances of concern are provided in Appendix A. Amec Foster Wheeler completed the field assessment portion of the above scope of work on 20 January 2016. PWGSC did not provide Amec Foster Wheeler any reports on the building for review.

2.0 DESCRIPTION OF SITE

At the time of the Site inspection, the property was developed as a single storey, industrial shop building. The building was constructed on piles with an elevated floor. The crawlspace below

the building was not enclosed. Various equipment was installed in the building during the Site visit however it was reported by PWGSC that staff only used the building to access equipment. The building was reported by PWGSC to have been constructed in 1974.

At the time of the site visit, the building finishes were in generally in fair to good condition with the exception of the sections of the ceiling that showed evidence of water damage. It was reported by PWGSC that a sprinkler had burst in the northwest section of the building in March 2015, resulting in a significant amount of water accumulation on the building floor.

All areas of the Site building interior and exterior were accessible.

The general Site construction details were as follows:

Exterior Walls:	The exterior walls of the building were observed to be metal clad siding.
Roof:	The roof was observed to asphalt shingles over building paper. Observation of the roof was limited due to heavy snow cover.
Attic:	The attic space was insulated with fibreglass batts.
Interior Walls:	Interior walls generally consisted of painted plywood. Plywood was observed to have been installed over cementitious (Transite) panels along the south exterior and adjoining section of west interior walls. Gypsum board walls were present in the mechanical room.
Floor:	The flooring consisted of painted plywood.
Interior Ceilings:	The ceilings consisted of painted gypsum board. Ceiling tiles were observed in the northeast office.
Lighting:	Lighting was fluorescent throughout the building.
Mechanical:	The heat was provided by a gas burning boiler with baseboard radiators.

Site photographs taken at the time of the site visit are provided in Appendix C.

3.0 SURVEY RESULTS

Ms. Karen Fortin and Mr. Mark Miller of Amec Foster Wheeler coordinated site inspection activities with Mr. Wally Ballas of PWGSC (Inuvik) who provided access and Site information for each of the structures.

Amec Foster Wheeler conducted a visual assessment of all accessible areas of the building as outlined in Appendix A: Survey Definitions and Methodology.

Photographs showing the Site condition and sample locations are provided in Appendix C

3.1 ASBESTOS-CONTAINING MATERIALS

During the survey of the Site, Amec Foster Wheeler collected samples of suspect ACMs which were submitted to EMC Labs Inc. laboratory in Phoenix, Arizona for confirmatory laboratory analysis. A total of thirty-two samples of approximately 24 separate building materials were collected and submitted for analysis. The results of Amec Foster Wheeler's ACM sampling activities are summarized in Tables 1 and 2 of Appendix B, digital photographs of representative

sampled materials are included in Appendix B, and the laboratory certificates of analysis are included in Appendix D.

ACMs identified include the following. All materials were generally observed in fair to good condition.

a) **Pipe fitting / elbow insulation materials (friable)** – observed throughout the building were determined to contain between 10% and 60% Chrysotile asbestos fibres based on samples ACM-02, ACM-04, ACM-06, ACM-08, ACM-10, ACM-12, ACM-14, ACM-16, ACM18, and ACM28 (Photos 2 through 11).
b) **Transite paneling (non-friable)** – was observed behind painted plywood on the south exterior wall and adjoining section of west interior wall in the south side of the building. The transite paneling was determined to contain 15% Chrysotile asbestos fibres based on sample ACM-29 (Photo 12).

There were a number of other suspect ACMs present in the building that were sampled and, based on the laboratory analysis undertaken, are not considered to be ACMs including the following:

a) Pipe insulation and wrap observed throughout the building (nine samples);
b) Suspended ceiling tile from the back office (one sample);
c) Gypsum board and joint compound (four samples);
d) Asphalt roof shingles (two samples);
e) Roofing felt ; and
f) Mastic and grout associated with ceramic tiles (two samples).

Pipe fitting / elbow insulation samples were determined to contain asbestos with the exception of one sample within the shop area. The nine samples of fitting insulation were visually similar and as such all fitting insulation should be treated as asbestos-containing.

ACMs may be present in forms that were not observed or sampled during the Site inspection including, but not limited to, caulking, fire-rated doors, thermal insulating materials such as gaskets associated with mechanical equipment, wiring and electrical components, packing associated with cast iron pipe joints, or in areas that were not accessible at the time of the survey.

For the purpose of renovation, demolition, or any other alteration or disturbance, all suspect ACMs, unless confirmed through sampling and analysis, should be considered to contain asbestos and handled in accordance with a written work plan that references current Territorial guidelines as presented in the document titled "*Northwest Territories & Nunavut Code of Practice on Asbestos Abatement"* (2012).

3.2 LEAD AND LEAD-CONTAINING PAINT

Based on the date of original building construction, there is a potential that LCP and other lead containing materials may have been used during construction of the original building or

subsequent renovations. Amec Foster Wheeler submitted 12 samples of paint (samples PB01, PB02, PB0, PB04, PB05, PB06, PB07, PB08, PB09, PB10, PB11 and PB12) for laboratory analysis. At the discretion of the assessor, sampled items included representative floors, interior walls, door trim, exterior wooden structures, and exterior doors. As explained in the report methodology, the sampling program considered typical paint coatings and not all surfaces were tested and mechanical equipment was not sampled. The samples were submitted to Amec Foster Wheeler's laboratory in Edmonton, Alberta for analysis of total lead content. The total lead concentration of the paint samples ranged from 12 mg/kg (parts per million) to 14,600 mg/kg (ppm). The highest total lead concentration was determined to be 14,600 mg/kg (ppm) from the blue paint sample (PB05) recovered from the exterior wood front deck.

As discussed in the Methodology Section, surface coatings with a lead content greater than 0.06% by weight (600 mg/kg) are considered to be LCPs for the purposes of this report. Laboratory results show that samples PB05 and PB07 collected from the exterior of the building are considered to be LCP.

Amec Foster Wheeler also submitted six of the above samples for further TCLP analysis. According to the *Guideline for Industrial Waste Discharges* in the Northwest Territories, the maximum allowable lead content in leachate from demolition debris is 5.0 milligrams per liter (mg/L). The TCLP samples collected by Amec Foster Wheeler ranged from 0.003 mg/L to 0.237 mg/L, all below the maximum allowable lead content for solid waste. The highest TCLP concentration was determined to be 0.237 mg/L from the light blue paint sample (TCLP21) associated with the interior door frames. The paint samples from the main exterior door and the exterior wood deck were not submitted for TCLP analysis.

Results of the laboratory analyses are summarized in Table 3 (Appendix B), digital photographs of the sample locations are included in Appendix C, and the Laboratory's Certificates of Analyses are included in Appendix D.

Based on the visual survey of the building, emergency light devices were observed in the building and are suspected to contain a lead acid battery. Other products on-Site that may contain lead include cable coverings and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials. Emergency exit signs and light devices were observed in the building and are suspected to contain lead acid batteries.

3.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler did not observe any mercury-containing thermostats on Site. Other potential mercury containing equipment present at the Site may include switches and thermostats associated with the building mechanical systems, however Amec Foster Wheeler did not observe any such equipment at the Site.

Fluorescent lamp tubes associated with the lighting throughout the site are suspected of containing mercury. Based on current literature the fluorescent lamps observed in the building are suspected of containing between 4 and 12 mg of mercury (see Appendix A). The number of potentially mercury containing bulbs is approximately 160 bulbs.

3.4 OZONE DEPLETING SUBSTANCES

Amec Foster Wheeler did not observe any equipment suspected of containing ozone depleting substances in the Site.

All equipment suspected of containing ODSs should be inspected by a qualified technician prior to removal or disposal and if found to contain ODS, the unit must be decommissioned in accordance with federal and Territorial regulations.

3.5 POLYCHLORINATED BIPHENYLS

Amec Foster Wheeler inspected the manufacturer's label on the ballasts from eight fluorescent light fixtures. The ballasts were labelled as containing "No PCBs", with the exception of one ballast observed within the mechanical room. Based on the information on the manufacturer's label (make and model), Amec Foster Wheeler determined that the ballast is non-PCB. Amec Foster Wheeler considers it good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed. All PCB-containing ballasts, known or assumed, must be stored and transported in accordance with applicable Territorial and Federal hazardous waste and transportation of dangerous goods legislation.

Amec Foster Wheeler submitted three samples of paint (samples PCB01, PCB02 and PCB03) for laboratory PCB analysis. Painted surfaces sampled included the shop floor, interior wall, and the exterior wood canopy. The samples were submitted to Amec Foster Wheeler's laboratory in Edmonton, Alberta for analysis of PCB content. Laboratory analysis results show PCBs concentrations of the three samples were less than the laboratory detection limit of 0.5 mg/kg.

3.6 SUSPECT VISUAL MOULD GROWTH AND WATER DAMAGE

Amec Foster Wheeler did not observe any SVG, however water damaged suspended ceiling tiles and gypsum board ceilings were observed in the back office area and the boiler room. SVG may be present within enclosed spaces and may have not been evident during the Site visit.

4.0 RECOMMENDATIONS FOR FUTURE DEMOLITION

The demolition recommendations for the materials identified in the building are provided below. It is assumed that all work will be completed on the vacant building in an area restricted to the public. All demolition activities shall be carried out in accordance with CSA standard S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures, the National Building Code Section 8 (Safety Measures at Construction and Demolition Sites) and other related sections.

All work shall be completed by qualified workers following written safe work procedures, in accordance with requirements of the General Safety Regulation, under the Northwest Territories Safety Act.

4.1 ASBESTOS-CONTAINING MATERIALS

Recommendations for the removal of ACMs identified in each of the proposed work areas are provided below. Completion of any of these recommendations must be performed by qualified

asbestos workers or abatement contractors and in accordance with a written work plan prepared based on existing current Territorial regulations and/or guidelines.

a) **Mechanical pipe fitting/elbow insulation (friable, approximately 25 fittings)** - observed throughout the building may be removed following Moderate Risk asbestos abatement activities such as glovebag asbestos abatement procedures.
b) **Transite wall paneling (non-friable, – approximately 34 m^2)** - observed in the shop area behind the painted plywood along the east and south exterior walls of the building may be removed following Low Risk asbestos abatement procedure. Additional transite paneling may be present behind plywood that could not be accessed or verified.

4.2 LEAD AND LEAD CONTAINING PAINT

Amec Foster Wheeler identified two LCP surface coatings which will be affected by building demolition activities. LCP was confirmed in painted surfaces including main exterior door and the exterior wooden deck structure. These are not suitable for disposal at a landfill in the Northwest Territories and a suitable disposal location will need to be identified.

TCLP analysis results for the six samples collected by Amec Foster Wheeler were below the maximum allowable lead leachate concentration for demolition debris.

Any remaining demolition debris is expected to be disposed of at most construction landfills without restriction, however this should be confirmed with the landfill receiving the demolition waste prior to demolishing the building so that any requirements for special handling or disposal can be determined and suitable arrangement made.

Based on the visual survey of the building, emergency light devices are suspected to contain lead-acid batteries. These are not suitable for disposal at a landfill in the Northwest Territories and a suitable disposal location will need to be identified. Other products on-Site that may contain lead include cable coverings and electrical equipment. These materials were not sampled at the time of the survey. There were no other lead-containing materials observed at the Site such as lead sheeting, cornices and other such materials.

All workers who may be exposed to lead must undergo hazard specific awareness training. All workers who may be performing activities that may create airborne lead dust, such as grinding, cutting, sandblasting or welding, should wear personal protective equipment including appropriate respiratory equipment, dermal protection and disposable coveralls. As lead containing paint poses a greater concern when heated, such as during welding operations, it is considered good practice to remove lead containing paint from surfaces to be welded or otherwise heated. Workers should also follow appropriate decontamination procedures prior to leaving the work area.

4.3 MERCURY CONTAINING DEVICES

Amec Foster Wheeler did not observe mercury-containing thermostats or other equipment on Site. The presence of mercury in fluorescent lamps and thermostats poses minimal risks to occupants or workers provided the equipment is handled properly and the mercury is not

allowed to escape. Prior to demolition activities the fluorescent lamps should be recycled or disposed.

4.4 OZONE DEPLETING SUBSTANCE

There was no equipment suspected to contain an ODS observed on the Site. Any suspect equipment discovered during demolition/renovation, should be inspected for the presence of ODSs and handled or disposed of in accordance with current Federal and Territorial regulations which shall be completed by trained and qualified technicians.

4.5 POLYCHLORINATED BIPHENYLS

Several fluorescent light fixture ballasts were observed at the Site. The ballasts were labelled or determined to be non-PCB. It is considered good practice to inspect all ballasts for PCBs as fluorescent light ballasts and/or fixtures are removed. If 'non-PCB' or 'No PCBs' labelling is not found on the ballasts, the ballasts should be compared to information obtained from the manufacture to determine PCB content. If the PCB content of the ballast cannot be determined, the ballast should be assumed to contain PCBs unless laboratory testing indicates otherwise. All PCB-containing ballasts, known or assumed, must be stored and transported in accordance with applicable Territorial and Federal hazardous waste and transportation of dangerous goods legislation

Amec Foster Wheeler completed a limited PCB in paint assessment. Three sample of suspect paint were collected and submitted for analysis. No PCBs were detected in the submitted samples.

4.6 SUSPECT VISIBLE GROWTH AND WATER DAMAGE

Amec Foster Wheeler did not observe any suspect visible growth (SVG), however water damaged was observed on the suspended ceiling tiles in the back office area and the gypsum board ceiling in the boiler room. As the building is slated for demolition, mould remediation is not expected.

4.7 OTHER RECOMMENDATIONS

It is recommended that all work be conducted in accordance with a Site specific demolition plan which should address such items as abatement, demolition methods, worker training and protection, decontamination procedures, dust suppression, and transportation and disposal of waste. It is expected that the demolition contractor will prepare such documents based on direction provided in project specification documents which are to be developed at a later date.

4.8 GENERAL WORKER PROTECTION

Amec Foster Wheeler recommends that any areas where damaged hazardous materials are present which may pose a worker exposure issue, be isolated and the area restricted to knowledgeable workers with appropriate personal protection equipment. Given that the Site is partially vacant and minimum maintenance is expected, the Site conditions are subject to change.

5.0 SURVEY LIMITATIONS

Within the limitations of the agreed-upon scope of work, the field observations, measurements and analysis are considered sufficient to provide an overview of existing potential concerns or form a general inventory of hazardous materials in the subject area of the building. It should be noted that the data presented herein were collected at specific sampling locations, and depending on the homogeneity of the samples, the data may vary between these locations. Some inherent limitations exist as to the thoroughness of this assessment due to the nature of building construction. For example it may not practical to test all pipe insulation for asbestos content at the Site due to the amount and locations and being located under existing materials. Some reasonable extrapolation (e.g., sampling of similar materials) was required from the findings of the assessment.

Reasonable efforts were made to identify all substances designated in this report; however, Amec Foster Wheeler may not have been able to identify and assess all suspect designated substances, as certain building materials may exist that were not visible or accessible at the time of the survey. Inaccessible locations include those that require demolition to gain entry, which present an unacceptable health or safety risk to the surveyors, and where entry is prohibited by security or other institutional restrictions. Areas above a suspended tile ceiling, crawlspaces, pipe chases and service tunnels, and areas behind an access hatch were considered accessible. Materials hidden by walls, finishes and equipment at the time of the survey were considered inaccessible.

The field observations, measurements and analysis are considered sufficient to form a general inventory of hazardous materials in the surveyed areas. It is possible that materials may exist which could not be reasonably identified within the scope of the assessment or which were not apparent or accessible during the Site visit. Within the limitations of the agreed-upon scope of work, the survey included building materials found within or forming part of the building envelope and building mechanical systems and equipment. The inspection did not include the identification of suspected hazardous materials located in the interior of electrical, mechanical (i.e. interior surfaces of ventilation ducting, boilers, etc.), or process manufacturing equipment, inside wall cavities (e.g., pipe chases), inaccessible ceiling plenums, sub floors, underlying materials (e.g., underlying flooring and paint layers), and where sampling could have affected the integrity of the system (e.g., water-proof roof membrane and caulking). Amec Foster Wheeler is not responsible for the repairs of building materials that were sampled during the survey.

This assessment has been undertaken and performed in a professional manner in accordance with generally accepted practices, using the degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. The findings of this report are based solely on the conditions of the Site encountered at the time of the Site visit on 20 January 2016, and are limited by the availability of information at the time of the survey. Due to physical limitations inherent to this work, Amec Foster Wheeler expressly does not warrant that the Site is free of designated substances or that all designated substances have been identified. It is possible that materials exist which could not be reasonably identified within the scope of the

survey or which were not apparent or accessible during the site visit. No other warranties, expressed or implied, are made.

6.0 CLOSURE

This report was prepared for the exclusive use of Public Works and Government Services Canada and is intended to provide an overview of existing potential concerns within the specified work area at the time of the Site visit. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Amec Foster Wheeler is required. With respect to third parties, Amec Foster Wheeler has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

Amec Foster Wheeler has prepared this report for the express use of Public Works and Government Services Canada and may be relied upon by Public Works and Government Services Canada. No other person or organization is entitled to rely upon any part of this report without the prior written consent of Amec Foster Wheeler. Public Works and Government Services Canada may release all or part(s) of this report to third parties; however, such third party in using this report agrees that it shall have no legal recourse against Amec Foster Wheeler or its subsidiaries, and shall indemnify and defend Amec Foster Wheeler or its subsidiaries from and against all claims arising out of or in conjunction with such use or reliance.

This report does not constitute legal advice. Amec Foster Wheeler makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel. In addition, Amec Foster Wheeler makes no determination or recommendation regarding the decision to purchase, sell or provide financing for this property.

This report presents an overview of issues of concern with the specified substances, reflecting Amec Foster Wheeler's best judgment using information reasonably available at the time of Amec Foster Wheeler's evaluation / survey. In preparing this report, Amec Foster Wheeler has relied upon certain information and representations provided by others. Amec Foster Wheeler did not attempt to independently verify the accuracy or completeness of that information. To the extent that the conclusions in this report are based in whole or in part on such information, those conclusions are contingent on its accuracy and validity. Amec Foster Wheeler assumes no responsibility for any consequence arising from any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to Amec Foster Wheeler.

This Report is subject to the contractual project agreement.

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

Respectfully,
Amec Foster Wheeler Environment & Infrastructure,
a Division of Amec Foster Wheeler Americas Limited,

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APPENDIX A
SURVEY DEFINITIONS AND METHODOLOGY

SURVEY DEFINITIONS, METHODOLOGY AND REGULATORY REQUIREMENTS

1.0 FIELD METHODOLOGY

The survey generally consisted of a room-by-room survey of all accessible areas within the buildings surveyed. The surveyor identified potential designated substances by appearance, age, and knowledge of current and historical uses of the Site and subject materials. Accessible locations are those for which entry is not prohibited by security or other institutional restrictions, that could be inspected without the need for destructive testing (e.g. penetration of a surface such as a wall, ceiling chase or shaft to gain access), and which did present an unacceptable health or safety risk to the surveyor. The area above a suspended tile ceiling, crawlspaces, pipe chases / service tunnels or behind an access hatch was generally considered to not be accessible. Materials hidden by walls, finishes and equipment at the time of the survey are considered inaccessible. Reasonable effort was used to identify potential designated substances in areas not readily accessible, such as confined areas enclosed by gypsum board, plaster, or panelling, etc., or where minor demolition was required to gain entry.

Intrusive sampling may have been conducted in the form of collecting samples of pipe insulation and other building materials, removing baseboards, lifting areas of carpet or flooring and cutting or breaking small holes in wallboard or plaster. Amec Foster Wheeler only performed such activities in areas where operation of the facility and the health and safety of occupants was affected. Effort was made to minimize or conceal damage. Amec Foster Wheeler was not responsible for the repair of any other areas sampled as part of this evaluation with the exception of temporary repairs to leave area in safe workplace condition.

While in the field, the surveyor completed a detailed checklist or collected detailed field notes for the building; a description of the rooms and a detailed description of any suspected designated substances observed within the rooms. Details of condition, visibility / accessibility, and any action that may be required to reduce asbestos fibre or other designated substances exposure hazards based on these observations were also recorded.

2.0 ASBESTOS-CONTAINING MATERIALS

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

The WSCC Asbestos Abatement Code of Practice states: “If asbestos-containing materials are identified and there is the potential for exposure, corrective action is required.” The Code of Practice also recommends considering the location, condition, function and cost prior to following the four basic approaches to controlling exposure: removal, encapsulation, enclosure and a management plan. The Code of Practice includes information on the techniques for the identification, safe abatement of asbestos-containing materials, and information on asbestos products, health hazards, worker protection, safe work procedures, inspection criteria, applicable

legislation and competency for those involved in abatement activities. This Code was adopted from the Alberta Asbestos Abatement Manual (2011).

In Northwest Territories, the *Occupational Health and Safety Regulations, Part 24* defines "asbestos" as a manufactured article or other material which contains 1% or more asbestos by weight either at the time of manufacture, or as determined by the following method:

- *NIOSH Method 9002, as amended from time to time, from the NIOSH Manual of Analytical Methods, 4th Edition, published by the National Institute for Occupational Safety and Health, United States.*

Friable material refers to an ACM that can be readily crumbled using hand pressure, separating asbestos fibres from the binding materials with which they are associated. Typical friable materials include acoustical or decorative spray applications, fireproofing, refractory and thermal insulation.

Non-friable material refers to an ACM that is associated with a binding agent (such as tar or cement) that prevents the ready release of airborne fibres. Typical non-friable materials include floor tiles, fire blankets, pre-formed manufactured cementitious insulation and wallboards, pipes, and siding. These materials are generally considered to pose a low hazard provided they remain intact and are not cut or shaped with power tools that are not equipped with a HEPA filtered dust collection system.

Amec Foster Wheeler collected samples of suspected ACMs and submitted them to EMC Labs Inc. (EMC) laboratory in Phoenix, Arizona and Amec Foster Wheeler's lab in Atlanta, Georgia for analysis. Both are National Voluntary Laboratory Accreditation Program (NVLAP) certified laboratories. The samples were analyzed using Polarized Light Microscopy (PLM) methods (EPA 600/R-93/116).

3.0 LEAD and LEAD CONTAINING PAINT

In building construction, lead was frequently used for roofs, cornices, tank linings, electrical conduits, and as a main component of soft solder ally used to seal pipe joints. Lead was also used extensively for pigmentation, sealing, and as a drying agent in oil based paints up until the early 1950's. Exterior paints typically contained up to 60% lead by weight.

In 1976, the Canadian Federal Government introduced the Liquid Coating Materials Regulations under the Federal Hazardous Products Act, restricting the maximum total lead content of paints and other liquid coating materials used in or around premises attended by children or pregnant women to 0.5% by weight (5000 mg/kg). In January 1991, Health Canada negotiated a voluntary reduction of lead content in all Canadian produced consumer paint to a maximum of 0.06%. Recently the Canadian Federal Government enacted the Surface Coating Materials Regulations which reduce the maximum total lead content of any new surface coatings for consumer products to 0.009% (90 mg/kg). This reduction does not generally apply to surface coating applied to buildings or other structures used for agricultural or industrial purposes or as an anti-weathering or anti-corrosive coating.

Northwest Territories Environmental Protection Act (EPA) considers a lead containing paint as any structural coating containing greater than 0.06% by weight (600 mg/kg). Surface coatings containing 600 mg/kg or 0.06% lead would be considered to represent a higher risk of exposure to

workers if disturbed during demolition activities. Removal or disturbance of paint coatings exceeding this concentration would require abatement or implementation of appropriate lead dust controls.

The Guideline for the General Management of Hazardous Waste describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste lead and lead paint debris. According to the Guideline for Industrial Waste Discharges in the NT, the maximum allowable lead content in leachate from solid waste including demolition debris is 5.0 milligrams per liter (mg/L). Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

In the preparation of this report, Amec Foster Wheeler consulted with Government of the Northwest Territories Environment Division who indicated that the current guidelines are under revision but are still to be followed. They further confirmed that any LCP (greater 600 mg/kg total or greater than 5.0 mg/kg TCLP) are not suitable for disposal at landfills in the Northwest Territories.

The survey included a description of typical building materials suspected to contain lead. Details of location, description, and condition were recorded. The survey included the collection of select bulk samples of readily accessible building materials suspected to contain a surface coating defined as a LCP. Paint chip samples were analyzed in accordance with U.S. EPA SW 846 3050 6010C for lead.

4.0 MERCURY

As part of the survey, Amec Foster Wheeler checked for such items as mercury containing thermostats, switches and lamps. Based on information provided by the U.S. Environmental Protection Agency (EPA), small commercial switches and thermostats may contain 2 to 18 mg of mercury with industrial switches and equipment containing 5 kg or more.

According to published literature including the Guide to Recycling Mercury-Containing lamps published by the Government of the Northwest Territories, older mercury containing lamps, the bulk of which are four foot T-12 fluorescent lamps, can contain up to 80 mg of mercury per lamp. Newer T-12, T-8 and T-5 style fluorescent lamps manufactured since 2000 have in the order of 3 to 12 mg of mercury per lamp. Other types of lamps, such as metal halide and high pressure sodium, can also contain mercury in the order of 20 to 250 mg/lamp.

The Canadian Council of Ministers of the Environment (CCME) *"Canada-Wide Standard for Mercury Containing Lamps"* (2001) is largely geared towards reducing the amount of mercury in lamps at the manufacturing stage; however they do recommend that the release of mercury can be minimized through the proper recycling and disposal of mercury containing lamps.

The Guideline for the General Management of Hazardous Waste describes acceptable TCLP methods that simulate the characteristics of material(s) when placed in a landfill. The purpose of the guideline is to provide standards for municipal government in the NWT for management of waste mercury. According to the Guideline for Industrial Waste Discharges in the NT, the maximum allowable mercury content in leachate from solid waste is 0.1 milligrams per liter (mg/L). The Guide to Recycling Mercury-Containing Lamps states that "*testing done in the NWT*

has confirmed that crushed mercury-containing lamps may not pass the leacheate test and therefore, are managed as hazardous waste". Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

5.0 POLYCHLORINATED BIPHENYL (PCB)

PCB-containing products were manufactured for use in applications where stable, fire-resistant, and heat-transfer properties were demanded between 1926-29 and 1977. Most PCBs were sold for use as dielectric fluids (insulating liquids) in electric transformers and capacitors. Other uses included heat transfer fluid, hydraulic fluid, dye carriers in carbonless copy paper, plasticizers in paints, adhesives, and caulking compounds. In Canada, PCBs were prohibited from being used in products, equipment, machinery, electrical transformers and capacitors that were manufactured or imported into the country after July 1980. However, older equipment in use after this date may still contain PCBs if the equipment's fluid has not been changed, or if there was sufficient inventory of such equipment.

As part of the survey, Amec Foster Wheeler assessed the Site for the presence of potential PCB-containing materials. Potential PCB-containing equipment or materials were identified by appearance, age and knowledge of current and historical uses of the Site and subject materials. The possible presence of PCBs in the fluorescent or other lamp ballasts was determined based on a visual assessment and the 1991 Environment Canada document entitled "*Identification of Lamp Ballasts Containing PCBs*." Light fixtures were characterized by type and a representative number of fixtures were examined in each functional area of the building, where accessible. Suspect electrical equipment including lighting ballasts was examined, where accessible.

There is a lack of clear Provincial / Territorial / Federal Regulatory framework to provide guidance on PCBs in building construction materials, particularly with respect to non-typical materials such as surface coatings and building materials. The regulations pertaining to PCBs are more related to liquids associated to electrical equipment and contaminated materials as opposed to PCBs in construction materials. The threshold for solid waste process residuals suitable for landfill as listed in the Guideline for Industrial Waste Discharges in the NWT is 50 mg/L by mass. Waste management and transfer of designated substances, is defined and outlined under the Guideline for the General Management of Hazardous Waste in the NWT.

PCBs are also regulated under the Federal Canadian Environmental Protection Act, 1999, PCB Regulation SOR/2008-273 which came into force September 2008 and subsequent amendment regulation SOR 2010-57; (http://www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=105). The Federal PCB regulations generally establish deadlines for ending the use and long term storage of PCBs and products containing PCBs. PCB-containing equipment or any PCB-containing substance with a PCB concentration at or in excess of 2 ppm for liquids and 50 ppm for solids (which pertain to applied surface coatings such as paint) are subject to the above Federal regulations.

Select paint samples were submitted for PCB analysis. Paint samples analysed were determined based on general industry literature which indicated industrial paint coatings exhibiting elastomeric properties or durable paints may contain PCBs. Such coatings may be applied to or used as floor markings, exterior doors, railings and concrete surfaces. Paint

samples were randomly selected to get a general representation of the building surveyed. Paint samples were analysed by Amec Foster Wheeler's Edmonton Laboratory.

6.0 OZONE DEPLETING SUBSTANCES

As part of the survey, Amec Foster Wheeler checked for equipment or materials which may contain ODS such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons. Typically these ODSs may be used as refrigerants, propellants, in the manufacture of items such as packaging, insulation, solvents and halon based fire extinguishing agents.

In Canada, the production or import of CFCs were banned in January 1996. CFCs were developed in the 1930s for use as a substitute refrigerant to ammonia. While less damaging to the ozone layer, HCFCs are scheduled to be phased out in Canada between the years 2010 and 2020.

In Canada, the Federal and Provincial governments have legislation in place for ODSs. Federally, ODS is regulated under the Federal Halocarbon Regulations (SOR/2003-289 and amendment regulation SOR/2009-221; (http://ec.gc.ca/ozone/default.asp?lang=En&n=E06A6B0D-1) which are under the authority of the Federal Environmental Protection Act (1999). The purpose of the Federal Halocarbon Regulation is to regulate the use, identification, leak testing and disposal of ODSs on a Federally owned property.

7.0 MOULD

Mould spores are ubiquitous in both indoor and outdoor environments and in the presence of adequate moisture, may pose a concern in a building environment. Suspected mould growth on building materials was identified by visual growth (referred to as suspect visual mould growth; SVG) or evidence of water intrusion / damage. Based on the walk-through and observations Amec Foster Wheeler performed a walk-through visual inspection of the site for evidence of substantial moisture issues and mould reservoirs and/or amplifiers. The presence and extent of any SVG and water damage was determined using reasonable means noting that Amec Foster Wheeler may not have been able to identify all possible fungal reservoirs, as certain materials may be hidden by walls, finishes and equipment.

No samples of SVG were collected as part of the project scope of work.

There are currently no regulations specifically covering exposure to mould and/or mould remediation practices in Canada and there are no occupational exposure limits that define acceptable levels of mould exposure without adverse health effects. Direction on the assessment and remediation of mould in this report is based on the *"Mould Guidelines for the Canadian Construction Industry"* Canadian Construction Association (document CCA82). February 2004.

8.0 REGULATORY REQUIREMENTS

Sections 122.1 and 125.1 of the Canada Labour Code (R.S.C., 1985, c. L-2) and Part X of the Canada Occupational Health and Safety Regulations (SOR/86-304) address asbestos/hazardous substances in federally operated workplaces.

As per the Canada Labour Code:

- *Section 122.1: "hazardous substance" includes a hazardous product and a chemical, biological or physical agent that, by reason of a property that the agent possesses, is hazardous to the safety or health of a person exposed to it.*
- *Section 125.1 Without restricting the generality of section 124 or limiting the duties of an employer under Section 125 but subject to any exceptions that may be prescribed, every employer shall, in respect of every work place controlled by the employer and, in respect of every work activity carried out by an employee in a workplace that is not controlled by the employer, to the extent that the employer controls the activity, (a) ensure that concentrations of hazardous substances in the work place are controlled in accordance with prescribed standards; (b) ensure that all hazardous substances in the work place are stored and handled in the manner prescribed; (c) ensure that all hazardous substances in the work place, other than hazardous products, are identified in the manner prescribed.*
- *Part X of the Canada Occupational Health and Safety Regulations Section 10.19 (1) states: "An employee shall be kept free from exposure to a concentration of […] (c) airborne chrysotile asbestos in excess of one fibre per cubic centimetre."*

With respect to asbestos in the Northwest Territories, prescribed standards include Sections 365 to 379, in Part 24 (Asbestos), of the Northwest Territories Occupational Health and Safety Regulations (OHSR). The OHSR provides information relating to the identification, labeling, inspection, processes and training in regards to ACMs in the workplace. Section 369 states, an employer shall ensure identification of asbestos-containing materials be performed by a competent person and that any demolition of structures containing asbestos be considered part of the asbestos process meaning the activity that may release asbestos dust.

Waste management and transfer of designated substances, is defined and outlined under the *Guideline for the General Management of Hazardous Waste in the NWT.*

APPENDIX B
SAMPLE SUMMARY TABLES

TABLE 1: SAMPLING INFORMATION SUMMARY – BULK ASBESTOS
Materials Determined to be Asbestos-Containing

Amec Foster Wheeler Sample No.	Lab ID No.	Photo No.	Sample Location Description	Sample Description	Laboratory Results	
					% Asbestos Fibres	Asbestos Type
ACM-02	0165867-002	2	Main Loop, NW Corner	Pipe fitting insulation	60	Chrysotile
ACM-04	0165867-004	3	Main Loop, NE Corner	Pipe fitting insulation	65	Chrysotile
ACM-06	0165867-006	4	Exiting South Line, Veering South	Pipe fitting insulation	50	Chrysotile
ACM-08	0165867-008	5	Front Office, next to bottom of rad	Pipe fitting insulation	60	Chrysotile
ACM-10	0165867-010	6	Front Entrance	Pipe fitting insulation	10	Chrysotile
ACM-12	0165867-012	7	E-W Line	Pipe elbow insulation	60	Chrysotile
ACM-14	0165867-014	8	Mechanical Room	125mm Pipe elbow insulation	10	Chrysotile
ACM-16	0165867-016	9	Mechanical Room	100mm Pipe elbow insulation	60	Chrysotile
ACM-18	0165867-017	10	Mechanical Room	75mm Pipe elbow insulation	60	Chrysotile
ACM-28	0165867-028	11	Bathroom	75mm Pipe fitting insulation	20	Chrysotile
ACM-29	0165867-029	12	South wall	Transite paneling	15	Chrysotile

TABLE 2: SAMPLING INFORMATION SUMMARY – BULK ASBESTOS
Materials Determined to be Non-Asbestos-Containing

Amec Foster Wheeler Sample No.	Lab ID No.	Photo No.	Sample Location Description	Sample Description	Laboratory Results	
					% Asbestos Fibres	Asbestos Type
ACM-01	0165867-001	2	Main Loop, NW corner	Pipe insulation and wrap (fibreglass)	No asbestos fibres detected	
ACM-03	0165867-003	3	Main Loop, NE corner	Pipe insulation and wrap (fibreglass)	No asbestos fibres detected	
ACM-05	0165867-005	4	South Line	Pipe insulation and wrap (fibreglass)	No asbestos fibres detected	
ACM-07	0165867-007	-	Front Office, at rad	Pipe insulation and wrap (fibreglass)	No asbestos fibres detected	
ACM-09	0165867-009	6	Front Office	Pipe insulation and wrap (fibreglass)	No asbestos fibres detected	
ACM-11	0165867-011	7	E-W Line	Pipe elbow insulation and wrap	No asbestos fibres detected	
ACM-13	0165867-013	-	Mechanical Room	Pipe insulation and wrap (fibreglass)	No asbestos fibres detected	
ACM-15	0165867-015	9	Mechanical Room	Pipe insulation and wrap (fibreglass)	No asbestos fibres detected	
ACM-17	0165867-017	10	Mechanical Room	Pipe insulation and wrap (fibreglass)	No asbestos fibres detected	
ACM-19	0165867-019	13	Back Office	Suspended ceiling tile	No asbestos fibres detected	
ACM-20	0165867-020	-	Ceiling	Gypsum board	No asbestos fibres detected	
ACM-21	0165867-021	-	Roof Surface, trade shop	Shingle – brown / black	No asbestos fibres detected	
ACM-22	0165867-022	-	Below Roof Shingle, trade shop	Roofing paper	No asbestos fibres detected	
ACM-23	0165867-023	-	Canopy Adjacent to trade shop	Shingle – brown / black	No asbestos fibres detected	
ACM-24	0165867-024	14	Countertop Mechanical Room	Counter Top – cream / brown and adhesive	No asbestos fibres detected	
ACM-25	0165867-025	15	Bathroom	Ceramic tile, mastic and grout	No asbestos fibres detected	
ACM-26	0165867-026	-	Bathroom	Ceramic tile, mastic and grout	No asbestos fibres detected	
ACM-27	0165867-027	11	Bathroom	Pipe insulation and wrap (fibreglass)	No asbestos fibres detected	
ACM-30	0165867-030	16	Boiler Room	Gypsum board, joint compound and paint	No asbestos fibres detected	
ACM-31	0165867-031	-	Ceiling	Gypsum board, joint compound and paint	No asbestos fibres detected	
ACM-32	0165867-032	-	Ceiling	Gypsum board, joint compound and paint	No asbestos fibres detected	

TABLE 3: LEAD LABORATORY RESULTS, TCLP ANALYSIS RESULTS				
Sample Description and Location	**Laboratory Results Total Lead (mg/kg)**	**Photo No.**	**Amec Foster Wheeler Sample No.**	**Toxicity Characteristic Leaching Procedure (TCLP) mg/L**
Grey floor paint - shop	61	17	PB01 TCLP16	0.003
Beige wall paint – near back door	193	18	PB02 TCLP17	0.015
Blue w/ grey under – front plywood by door	42	-	PB03 TCLP18	0.016
Blue w/ orange under - metal	13	-	PB04	-
Blue w/ orange under – front deck (underside / stairs)	**14600**	19	PB05	**-**
Blue – Canopy & Overhang	127	-	PB06 TCLP19	0.016
Brown w/ blue under – main doors of Trade Shop	**1640**	19	PB07	**-**
Beige Paint – Front Office	50	20	PB08	-
Green Paint – Front Office	318	21	PB09	-
Light Blue Trim Paint – Interior door frames	500	22	PB10 TCLP21	0.237
Light Green Paint - Bathroom	402	23	PB11 TCLP22	0.006
Teal / Light Blue Primer – Mechanical Room door frame	12	-	PB12	-

APPENDIX C
SITE PHOTOGRAPHS

Photo 1: View of Trade Shop building located at 74B Franklin Road in Inuvik, NT.

Photo 2: Sample ACM-02; Main Loop, NW Corner, pipe fitting insulation was determined to **contain 10-60% Chrysotile asbestos fibres.**

Photo 3: Sample ACM-04; Main Loop, NE Corner, pipe fitting insulation was determined to **contain 5-65% Chrysotile asbestos fibres.**

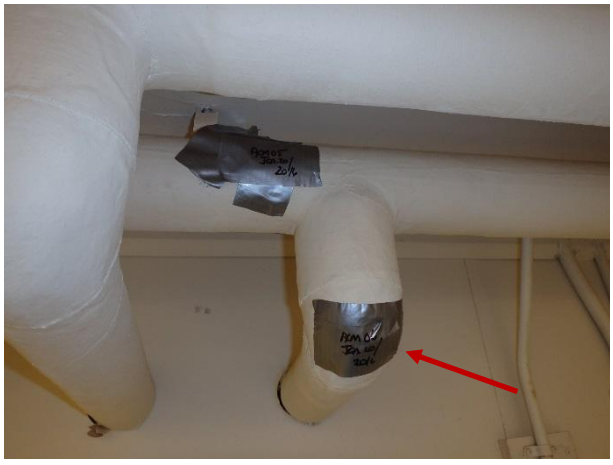

Photo 4: Sample ACM-06; Exiting South Line, Veering South, pipe fitting insulation was determined to **contain 10-50% Chrysotile asbestos fibres.**

Photo 5: Sample ACM-08; Front Office, next to bottom rad, pipe fitting insulation was determined to **contain 5-60% Chrysotile asbestos fibres.**

Photo 6: Sample ACM-10; Front Entrance pipe insulation was determined to **contain 10% Chrysotile asbestos fibres.**

74B Franklin, Inuvik, Northwest Territories	Photo Date: 20 January 2016	Project No.: TV147020	Figure 1

Photo 7: Sample ACM-12; Main Loop, East – West Line, pipe fitting insulation was determined to **contain 2-60% Chrysotile asbestos fibres.**

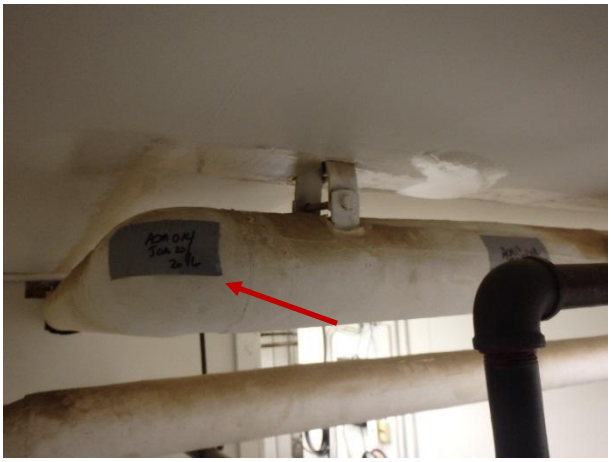

Photo 8: Sample ACM-14; Mechanical Room, 125mm pipe elbow insulation was determined to **contain 10% Chrysotile asbestos fibres.**

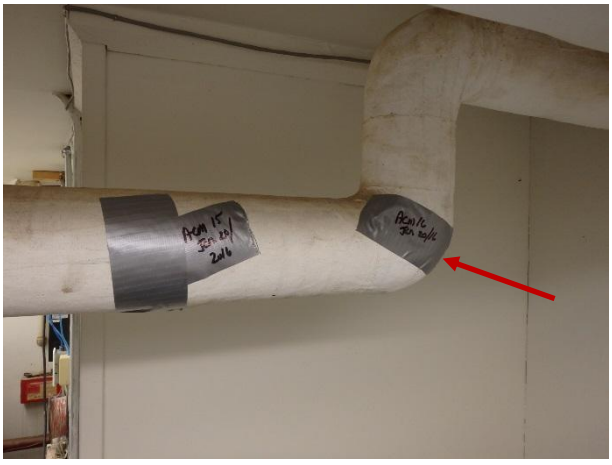

Photo 9: Sample ACM-16; Mechanical Room, 100mm pipe elbow insulation was determined to **contain 5-60% Chrysotile asbestos fibres.**

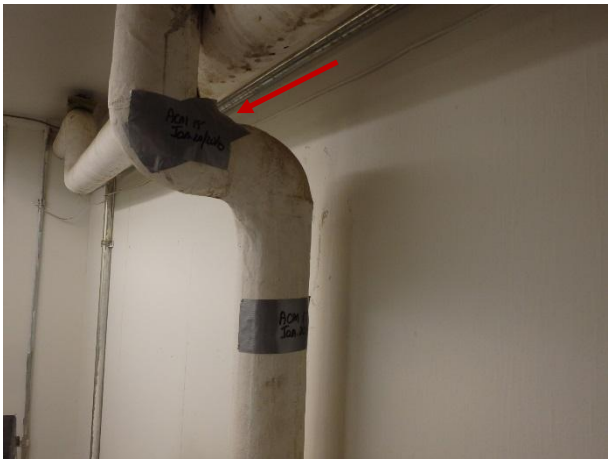

Photo 10: Sample ACM-18; Mechanical Room, pipe elbow insulation was determined to **contain 5-60% Chrysotile asbestos fibres.**

Photo 11: Sample ACM-28; Bathroom, 75mm pipe insulation was determined to **contain 20% Chrysotile asbestos fibres**

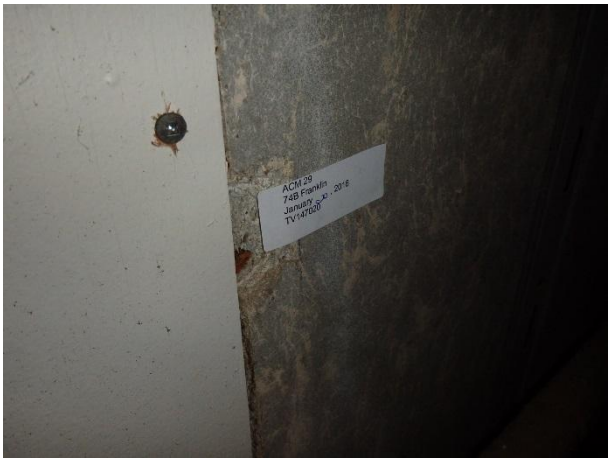

Photo 12: Sample ACM-29; South exterior wall, Transite was determined to **contain 15% Chrysotile asbestos fibres**

74B Franklin, Inuvik, Northwest Territories	Photo Date: 20 January 2016	Project No.: TV147020	Figure 2

Photo 13: Sample ACM-19; Back Office, suspended ceiling tile; no asbestos fibres detected.

Photo 14: Sample ACM-24; Mechanical room, counter top; no asbestos fibres detected.

Photo 15: Sample ACM-25; Bathroom, ceramic tile, mastic and grout; no asbestos fibres detected.

Photo 16: Sample ACM-30; Boiler room, gypsum board joint compound; no asbestos fibres detected.

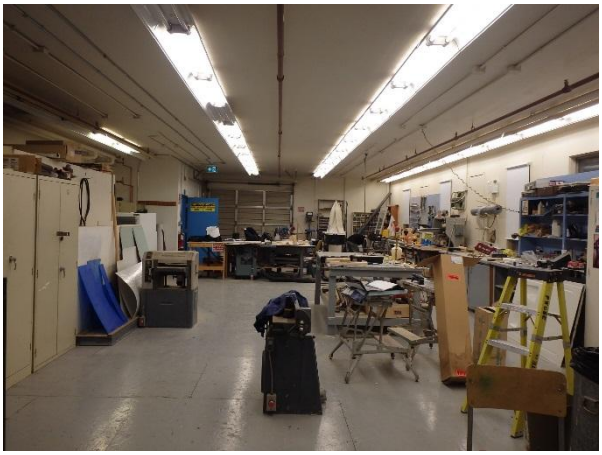

Photo 17: Sample PB01/TCLP16; grey paint on floor of the shop area; determined to have a total lead concentration of 61 mg/kg and TCLP concentration of 0.003mg/L.

Photo 18: Sample PB02/TCLP17; beige paint on plywood covering the Transite panels; determined to have a total lead concentration of 193 mg/kg and TCLP concentration of 0.015mg/L.

74B Franklin, Inuvik, Northwest Territories	Photo Date: 20 January 2016	Project No.: TV147020	Figure 3

Photo 19: Samples PB05 blue paint on deck and PB07 brown paint on metal door were determined to be LCPs with total lead concentrations of 14,600 mg/kg and 1,640 mg/kg, respectively.

Photo 20: Sample PB-08; beige paint throughout front office; determined to have a total lead concentration of 50 mg/kg.

Photo 21: Sample PB09; green paint throughout front office; determined to have a total lead concentration of 318 mg/kg.

Photo 22: Sample PB10/TCLP21; light blue trim paint on interior door frames; determined to have a total lead concentration of 500 mg/kg and a TCLP concentration of 0.237mg/L (ppm).

Photo 23: Sample PB-11; light green paint throughout bathroom; determined to have a total lead concentration of 402 mg/kg and a TCLP concentration of 0.006mg/L (ppm).

Photo 24: View of emergency lighting on wall suspected to contain a lead acid battery.

74B Franklin, Inuvik, Northwest Territories	Photo Date: 20 January 2016	Project No.: TV147020	Figure 4

Photo 25: View of a typical fluorescent light ballast observed at the site with a manufacturer's label noting "no-PCB".

Photo 26: View of water damaged suspended ceiling tiles in the northeast office. Note the fluorescent light tubes suspected to contain mercury.

Photo 27: View of water damaged materials on the floor in the back office area.

Photo 28: View of water damaged gypsum board ceiling the in boiler room.

Photo 29: View of the gas fired boiler.

Photo 30: View of the south section of building (west facing view).

74B Franklin, Inuvik, Northwest Territories	Photo Date: 20 January 2016	Project No.: TV147020	Figure 5

APPENDIX D
LABORATORY CERTIFICATES OF ANALYSES

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0165867

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	TC147020
Address:	440 DOVERCOURT DRIVE	Date Received:	01/29/2016
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	02/05/2016
Collected:	01/20/2016	Date Reported:	02/05/2016
Project Name:	INUVIK HAZMAT	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	KAREN FORTIN
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0165867-001 ACM-01-74B FRANKLIN	MAIN LOOP, NW CRNR	LAYER 1 Insulation, Yellow	No	None Detected		Fibrous Glass Cellulose Fiber Gypsum Binder/Filler	95% 2% 3%
		LAYER 2 Pipe Wrap, Off White Note: Difficult to separate adjacent layer	No	None Detected		Cellulose Fiber Fibrous Glass Gypsum Binder/Filler	95% 2% 3%
0165867-002 ACM-02-74B FRANKLIN	ADJ TO ACM 1, MAIN LOOP, NW CRNR	LAYER 1 Insulation, Off White	Yes	Chrysotile	10%	Mineral Wool Gypsum Mica Quartz Carbonates	30% 60%
		LAYER 2 Insulation, Gray	Yes	Chrysotile	60%	Mineral Wool Gypsum Mica Quartz	10% 30%
		LAYER 3 Wrap, Off White Note: Difficult to separate adjacent layer	No	None Detected		Cellulose Fiber Carbonates Binder/Filler	85% 15%
0165867-003 ACM-03-74B FRANKLIN	MAIN LOOP, NE CRNR	LAYER 1 Insulation, Yellow	No	None Detected		Fibrous Glass Cellulose Fiber Gypsum Binder/Filler	95% 3% 2%
		LAYER 2 Pipe Wrap, Off White Note: Difficult to separate adjacent layer	No	None Detected		Cellulose Fiber Fibrous Glass Gypsum Carbonates Binder/Filler	90% 3% 7%

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Address:	440 DOVERCOURT DRIVE	Date Received:	01/29/2016
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	02/05/2016
Collected:	01/20/2016	Date Reported:	02/05/2016
Project Name:	INUVIK HAZMAT	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	KAREN FORTIN
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0165867-004 ACM-04-74B FRANKLIN	MAIN LOOP, NE CRNR	LAYER 1 Insulation, Off White	Yes	Chrysotile	5%	Mineral Wool	35%
						Gypsum Mica Quartz Carbonates	60%
		LAYER 2 Insulation, Gray	Yes	Chrysotile	65%	Mineral Wool	5%
						Gypsum Mica Quartz	30%
		LAYER 3 Wrap, Off White Note: Difficult to separate adjacent layer	No	None Detected		Cellulose Fiber	85%
						Carbonates Binder/Filler	15%
0165867-005 ACM-05-74B FRANKLIN	SOUTH LINE	LAYER 1 Insulation, Yellow	No	None Detected		Fibrous Glass Cellulose Fiber	95% 2%
						Gypsum Binder/Filler	3%
		LAYER 2 Pipe Wrap, Off White Note: Difficult to separate adjacent layer	No	None Detected		Cellulose Fiber Fibrous Glass	95% 2%
						Gypsum Binder/Filler	3%
0165867-006 ACM-06-74B FRANKLIN	EXITING SOUTH LINE, VEERING SOUTH	LAYER 1 Insulation, Off White	Yes	Chrysotile	10%	Mineral Wool	30%
						Gypsum Mica Quartz Carbonates	60%
		LAYER 2 Insulation, Gray	Yes	Chrysotile	50%	Mineral Wool	15%
						Gypsum Mica Quartz Binder/Filler	35%

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Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0165867

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	TC147020
Address:	440 DOVERCOURT DRIVE	Date Received:	01/29/2016
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	02/05/2016
Collected:	01/20/2016	Date Reported:	02/05/2016
Project Name:	INUVIK HAZMAT	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	KAREN FORTIN
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0165867-007 ACM-07-74B FRANKLIN	FRONT OFFICE, AT RAD	LAYER 1 Insulation, Yellow	No	None Detected		Fibrous Glass	97%
						Gypsum Binder/Filler	3%
		LAYER 2 Pipe Wrap, Off White Note: Difficult to separate adjacent layer	No	None Detected		Cellulose Fiber	95%
						Carbonates Binder/Filler	5%
0165867-008 ACM-08-74B FRANKLIN	FRONT OFFICE NEXT TO BOTTOM OF RAD	LAYER 1 Insulation, Off White	Yes	Chrysotile	5%	Mineral Wool	25%
						Gypsum Mica Quartz Carbonates	70%
		LAYER 2 Insulation, Gray	Yes	Chrysotile	60%	Mineral Wool	5%
						Gypsum Mica Quartz Carbonates	35%
		LAYER 3 Wrap, Off White Note: Difficult to separate adjacent layer	Yes	Chrysotile	2%	Cellulose Fiber	90%
						Carbonates Binder/Filler	8%
0165867-009 ACM-09-74B FRANKLIN	FRONT ENTRANCE	LAYER 1 Insulation, Yellow	No	None Detected		Fibrous Glass	97%
						Gypsum Binder/Filler	3%
		LAYER 2 Pipe Wrap, Off White Note: Difficult to separate adjacent layer	No	None Detected		Cellulose Fiber	95%
						Carbonates Binder/Filler	5%

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Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	TC147020
Address:	440 DOVERCOURT DRIVE	Date Received:	01/29/2016
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	02/05/2016
Collected:	01/20/2016	Date Reported:	02/05/2016
Project Name:	INUVIK HAZMAT	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	KAREN FORTIN
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0165867-010 ACM-10-74B FRANKLIN	FRONT ENTRANCE	LAYER 1 Insulation, Off White	Yes	Chrysotile	10%	Mineral Wool	30%
						Gypsum Mica Quartz Carbonates	60%
		LAYER 2 Wrap, Off White Note: Difficult to separate adjacent layer	No	None Detected		Cellulose Fiber	90%
						Carbonates Binder/Filler	10%
0165867-011 ACM-11-74B FRANKLIN	E-W LINE	LAYER 1 Insulation, Yellow	No	None Detected		Fibrous Glass Cellulose Fiber	95% 2%
						Gypsum Binder/Filler	3%
		LAYER 2 Pipe Wrap, Off White Note: Difficult to separate adjacent layer	No	None Detected		Cellulose Fiber Fibrous Glass	90% 5%
						Carbonates Binder/Filler	5%
0165867-012 ACM-12-74B FRANKLIN	E-W LINE	LAYER 1 Elbow Insulation, Gray	Yes	Chrysotile	60%	Mineral Wool	10%
						Gypsum Mica Quartz Carbonates	30%
		LAYER 2 Wrap, Off White Note: Difficult to separate adjacent layer	Yes	Chrysotile	2%	Cellulose Fiber Mineral Wool	85% 3%
						Gypsum Carbonates Binder/Filler	10%
0165867-013 ACM-13-74B FRANKLIN	MECHANICAL RM	LAYER 1 5" Pipe Insulation, Yellow	No	None Detected		Fibrous Glass	97%
						Gypsum Binder/Filler	3%
		LAYER 2 Pipe Wrap, Off White Note: Difficult to separate adjacent layer	No	None Detected		Cellulose Fiber	90%
						Carbonates Binder/Filler	10%

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Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	TC147020
Address:	440 DOVERCOURT DRIVE	Date Received:	01/29/2016
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	02/05/2016
Collected:	01/20/2016	Date Reported:	02/05/2016
Project Name:	INUVIK HAZMAT	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	KAREN FORTIN
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0165867-014 ACM-14-74B FRANKLIN	MECHANICAL RM	LAYER 1 5" Elbow Pipe Insulation, Gray	Yes	Chrysotile	10%	Mineral Wool Gypsum Mica Quartz Carbonates	30% 60%
		LAYER 2 Wrap, Off White	No	None Detected		Cellulose Fiber Carbonates Binder/Filler	90% 10%
0165867-015 ACM-15-74B FRANKLIN	MECHANICAL RM	LAYER 1 4" Pipe Insulation, Yellow	No	None Detected		Fibrous Glass Cellulose Fiber Gypsum Binder/Filler	97% 1% 2%
		LAYER 2 Pipe Wrap, Off White	No	None Detected		Cellulose Fiber Carbonates Binder/Filler	90% 10%
0165867-016 ACM-16-74B FRANKLIN	MECHANICAL RM	LAYER 1 4" Elbow Pipe Insulation, Gray	Yes	Chrysotile	60%	Mineral Wool Gypsum Mica Quartz Carbonates	10% 30%
		LAYER 2 Wrap, Off White Note: Difficult to separate adjacent layer	Yes	Chrysotile	5%	Cellulose Fiber Carbonates Binder/Filler	85% 10%
0165867-017 ACM-17-74B FRANKLIN	MECHANICAL RM	LAYER 1 3" Pipe Insulation, Yellow	No	None Detected		Fibrous Glass Cellulose Fiber Gypsum Binder/Filler	95% 2% 3%
		LAYER 2 Pipe Wrap, Off White	No	None Detected		Cellulose Fiber Carbonates Binder/Filler	90% 10%

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Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	TC147020
Address:	440 DOVERCOURT DRIVE	Date Received:	01/29/2016
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	02/05/2016
Collected:	01/20/2016	Date Reported:	02/05/2016
Project Name:	INUVIK HAZMAT	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	KAREN FORTIN
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0165867-018 ACM-18-74B FRANKLIN	MECHANICAL RM	LAYER 1 3" Elbow Pipe Insulation, Gray	Yes	Chrysotile	60%	Mineral Wool	10%
						Gypsum Mica Quartz	
						Carbonates	30%
		LAYER 2 Insulation, Off White	Yes	Chrysotile	30%	Mineral Wool	5%
						Gypsum Mica Quartz	
						Carbonates	65%
		LAYER 3 Wrap, Off White Note: Difficult to separate adjacent layer	Yes	Chrysotile	5%	Cellulose Fiber	85%
						Gypsum Carbonates	
						Binder/Filler	10%
0165867-019 ACM-19-74B FRANKLIN	BACK OFFICE	Acoustic Ceiling Tile, Tan / White	No	None Detected		Mineral Wool	50%
						Cellulose Fiber	30%
						Carbonates Perlite	
						Binder/Filler	20%
0165867-020 ACM-20-74B FRANKLIN	CEILING	Drywall, Off White/ Brown Note: No Joint Compound Present	No	None Detected		Cellulose Fiber	10%
						Fibrous Glass	3%
						Gypsum Carbonates Mica Quartz	
						Binder/Filler	87%
0165867-021 ACM-21-74B FRANKLIN	ROOF SURFACE, TRADE SHOP	Shingle, Brown/ Black	No	None Detected		Cellulose Fiber	20%
						Quartz Carbonates	
						Binder/Filler	80%
0165867-022 ACM-22-74B FRANKLIN	BELOW SHINGLE AT ROOF, TRADE SHOP	Roof Paper, Black	No	None Detected		Fibrous Glass	30%
						Cellulose Fiber	5%
						Carbonates	
						Binder/Filler	65%

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NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	TC147020
Address:	440 DOVERCOURT DRIVE	Date Received:	01/29/2016
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	02/05/2016
Collected:	01/20/2016	Date Reported:	02/05/2016
Project Name:	INUVIK HAZMAT	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	KAREN FORTIN
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0165867-023 ACM-23-74B FRANKLIN	CANOPY ADJACENT TO TRADE SHOP	Shingle, Brown/ Black	No	None Detected	Cellulose Fiber Quartz Carbonates Binder/Filler	20% 80%
0165867-024 ACM-24-74B FRANKLIN	COUNTERTOP, MECHANICAL RM	LAYER 1 Counter Top, Cream/ Brown	No	None Detected	Quartz Gypsum Binder/Filler	 100%
		LAYER 2 Adhesive, Green	No	None Detected	Cellulose Fiber Quartz Gypsum Binder/Filler	5% 95%
0165867-025 ACM-25-74B FRANKLIN	BATHRM	LAYER 1 Ceramic Tile, Blue/ White	No	None Detected	Carbonates Gypsum Quartz Binder/Filler	 100%
		LAYER 2 Mastic, Yellow	No	None Detected	Cellulose Fiber Quartz Carbonates Binder/Filler	2% 98%
		LAYER 3 Grout, White	No	None Detected	Cellulose Fiber Carbonates Gypsum Quartz Binder/Filler	<1% 99%

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NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	TC147020
Address:	440 DOVERCOURT DRIVE	Date Received:	01/29/2016
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	02/05/2016
Collected:	01/20/2016	Date Reported:	02/05/2016
Project Name:	INUVIK HAZMAT	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	KAREN FORTIN
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0165867-026 ACM-26-74B FRANKLIN	BATHRM	LAYER 1 Ceramic Tile, Cream	No	None Detected		Carbonates Gypsum Quartz Binder/Filler	100%
		LAYER 2 Mastic, Yellow	No	None Detected		Cellulose Fiber Quartz Carbonates Binder/Filler	1% 99%
		LAYER 3 Grout, White	No	None Detected		Cellulose Fiber Carbonates Gypsum Quartz Binder/Filler	<1% 99%
0165867-027 ACM-27-74B FRANKLIN	BATHRM	LAYER 1 3" Pipe Insulation, Yellow	No	None Detected		Fibrous Glass Cellulose Fiber Gypsum Binder/Filler	95% 2% 3%
		LAYER 2 Pipe Wrap, Off White/Lt. Green Note: Difficult to separate adjacent layer	No	None Detected		Cellulose Fiber Carbonates Binder/Filler	90% 10%
0165867-028 ACM-28-74B FRANKLIN	BATHRM	LAYER 1 3" Elbow Pipe Insulation, Gray Tan	Yes	Chrysotile	20%	Mineral Wool Cellulose Fiber Gypsum Mica Quartz Carbonates	40% 5% 35%
		LAYER 2 Wrap, Off White/Lt. Green	No	None Detected		Cellulose Fiber Carbonates Binder/Filler	90% 10%

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Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	TC147020
Address:	440 DOVERCOURT DRIVE	Date Received:	01/29/2016
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	02/05/2016
Collected:	01/20/2016	Date Reported:	02/05/2016
Project Name:	INUVIK HAZMAT	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	KAREN FORTIN
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0165867-029 ACM-29-74B FRANKLIN	SOUTH WALL	Transite, Lt. Gray	Yes	Chrysotile	15%	Cellulose Fiber Fibrous Glass Carbonates Gypsum Quartz Binder/Filler	2% 3% 80%
0165867-030 ACM-30-74B FRANKLIN	BOILER RM	LAYER 1 Drywall, White/ Brown	No	None Detected		Cellulose Fiber Fibrous Glass Gypsum Carbonates Mica Quartz	13% 2% 85%
		LAYER 2 Joint Compound, White	No	None Detected		Cellulose Fiber Carbonates Mica Quartz	2% 98%
		LAYER 3 Texture / Paint, White/ Off White	No	None Detected		Carbonates Mica Quartz Binder/Filler	 100%
0165867-031 ACM-31-74B FRANKLIN	CEILING	LAYER 1 Drywall, White/ Brown	No	None Detected		Cellulose Fiber Fibrous Glass Gypsum Carbonates Mica Quartz	13% 2% 85%
		LAYER 2 Joint Compound, White	No	None Detected		Cellulose Fiber Carbonates Mica Quartz Gypsum	2% 98%
		LAYER 3 Texture / Paint, White/ Off White	No	None Detected		Cellulose Fiber Carbonates Mica Quartz Binder/Filler	1% 99%

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Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	TC147020
Address:	440 DOVERCOURT DRIVE	Date Received:	01/29/2016
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	02/05/2016
Collected:	01/20/2016	Date Reported:	02/05/2016
Project Name:	INUVIK HAZMAT	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	KAREN FORTIN
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0165867-032 ACM-32-74B FRANKLIN	CEILING	LAYER 1 Drywall, White/ Brown	No	None Detected	Cellulose Fiber Fibrous Glass Gypsum Carbonates Mica Quartz	10% 3% 87%
		LAYER 2 Joint Compound, White	No	None Detected	Cellulose Fiber Carbonates Mica Quartz Gypsum	3% 97%
		LAYER 3 Texture / Paint, White/ Off White	No	None Detected	Cellulose Fiber Carbonates Mica Quartz Binder/Filler	1% 99%
0165867-033 DUP 1-74B FRANKLIN	DO NOT ANALYZE	Note: *Not analyzed per client request				
0165867-034 DUP 3-74B FRANKLIN	DO NOT ANALYZE	Note: *Not analyzed per client request				

Analyst - Johann Hofer

Signatory - Lab Director - Kurt Kettler

Final Analytical Report

Attention: Paul Houle

Amec Foster Wheeler Environment & Infrastructure
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Results for File: EC-70519

Project Number: TV147020
Project Name: Inuvik HazMat

Date Received: 2016/01/28
Date of Report: 2016/02/08

Report reviewed by:

Jesse Dang, B.Sc.
Manager
Laboratory Services

Kristine Connor
Director of QA/QC
Laboratory Services

** All samples will be disposed of after 30 days following analysis. Please contact the lab if you require additional sample storage time. (Samples deemed hazardous will be returned to the client at their own expense or disposal will be arranged.) **

Paint Analysis

Project No. TV147020

Final
File No. EC-70519

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1586 PB01 - 74B Franklin 2016/01/20 8:00	16-1586-D PB01 - 74B Franklin Lab Duplicate	16-1587 PB02 - 74B Franklin 2016/01/20 8:15	16-1588 PB03 - 74B Franklin 2016/01/20 8:25
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	61	65	193	42
LL	2016/01/29	Lead	%	Calc	0.0010	0.0061	0.0065	0.0193	0.0042

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1589 PB04 - 74B Franklin 2016/01/20 8:40	16-1590 PB05 - 74B Franklin 2016/01/20 8:50	16-1591 PB06 - 74B Franklin 2016/01/20 9:10	16-1592 PB07 - 74B Franklin 2016/01/20 9:25
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	13	14600	127	1640
LL	2016/01/29	Lead	%	Calc	0.0010	0.0013	1.461	0.0128	0.1640

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1593 PB08 - 74B Franklin 2016/01/20 9:40	16-1594 PB09 - 74B Franklin 2016/01/20 10:00	16-1595 PB10 - 74B Franklin 2016/01/20 10:20	16-1596 PB11 - 74B Franklin 2016/01/20 10:35
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	50	318	500	402
LL	2016/01/29	Lead	%	Calc	0.0010	0.0050	0.0318	0.0500	0.0402

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1597 PB12 - 74B Franklin 2016/01/20 10:50	16-1598 Dup2 - 74B Franklin 2016/01/20 11:10	16-1599 TCLP16 - 74B Franklin 2016/01/20 11:30	16-1600 TCLP17 - 74B Franklin 2016/01/20 11:45
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	---	---	0.003	0.015
TY	2016/02/01	Lead	mg/kg (ppm)	EPA 3050/6010	10	12	25	---	---
LL	2016/01/29	Lead	%	Calc	0.0010	0.0012	0.0025	---	---

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-1601 TCLP18 - 74B Franklin 2016/01/20 11:55	16-1601-D TCLP18 - 74B Franklin Lab Duplicate	16-1602 TCLP19 - 74B Franklin 2016/01/20 12:10	16-1603 TCLP21 - 74B Franklin 2016/01/20 12:20
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	0.016	0.016	0.016	0.237

Paint Analysis

Final

Project No. TV147020 File No. EC-70519

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: Client ID: Sample Date: DL	16-1604 TCLP22 - 74B Franklin 2016/01/20 12:35
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	0.006

Paint Analysis - Polychlorinated Biphenyls

Project No. TV147020

Final
File No. EC-70519

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: Client ID: Sample Date: DL	16-1605 PCB01 - 74B Franklin 2016/01/20 12:45	16-1606 PCB02 - 74B Franklin 2016/01/20 12:55	16-1607 PCB03 - 74B Franklin 2016/01/20 13:05
PC	2016/01/28	PCB - Total	mg/kg (ppm)	EPA 3550/8082	0.5	< 0.5	< 0.5	< 0.5
PC	2016/01/28	Decachlorobiphenyl Surrogate Recovery	%	EPA 3550/8082	0.1	82.7	85.3	81.9
PC	2016/01/28	Tetrachloro-m-xylene Surrogate Recovery	%	EPA 3550/8082	0.1	86.0	87.0	82.4

Quality Control Standard

Project No. TV147020 File No. EC-70519

Paint Analysis

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Analyzed Value	Advisory Range	Target Value	Reference No.
LL	2016/01/29	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.215	0.188-0.455	0.321	ERA D079-544
TY	2016/02/01	Lead	µg/g (ppm)	EPA 3050/6010	93	75-125	100	Metal-1

Paint Analysis - Polychlorinated Biphenyls

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Analyzed Value	Advisory Range	Target Value	Reference No.
PC	2016/01/28	PCB - Total	ug/g(ppm)	EPA 3550/8082	13	6.30-18.0	14.8	ERA D040726

Analytical Comments

Project No. TV147020 File No. EC-70519

All Analytical results pertain to samples analyzed as received.

DL - Detection Limit

EPA: U.S. Environmental Protection Agency. 1997. Test Methods of Evaluation of Solid Waste 3rd Ed through Update III. Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

Extraction and analysis limits for holding time for Hydrocarbons were met.