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**BABINE HOUSING DEMOLITION**  
**SUMMARY OF WORK**



**Picture of the Atco Trailer to be demolished**

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***The present section describes the scope of work which comprises:***

- **Demolition:** the demolition and removal of a 20ftx80ft housing unit made of ATCO trailers with a floating roof built over top. The demolition must also include the existing foundation. All materials to be disposed of to a facility or location approved by Fisheries and Ocean Canada (DFO)
- **Salvage:** All utilities to be capped outside of the building footprint for future reuse when the building is replaced. Any items designated by DFO to be reused or recycled.

#### **LIST OF APPENDICES**

- **1. Building Pictures**
- **2. Building floor plan**
- **3. Specifications**
- **4. Pre-Renovation Hazardous Materials Inventory (Cascadia OHS) with Asbestos sample**
- **5. Expanded Fungal report (EMSL)**

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## **1) Introduction and Scope Description**

Fisheries and Oceans Canada (DFO) is looking for experienced contractors to demolish an existing housing unit.

The building is an old 20ftx80ft ATCO trailer with a floating roof built over top. Pictures are attached in the Appendix section. Building foundations must be removed as well.

It is expected a new building will be built in place of the existing unit to be demolished. The construction of the new building is not part of the scope.

The Trade Contractor must have previous demolition experience and must be able to deploy adequate equipment and skilled personnel to complete work expediently in an efficient and orderly Manner.

Contractor to inspect and locate all utilities (water, sewer, power, propane, communication). The utilities are to be capped or decommissioned in a way that allows DFO to re-use them for the construction of a new building. The new building is intended to be located approximately at the same location.

The scope includes locating all the building services and interrupting them as required. Specifically, the power supply must be turned off and disconnected from the building before any demolition activities.

Propane tank: It is the contractor's responsibility to re-locate the propane tank at a location approved by DFO if the contractor considers it necessary to complete the demolition work.

## **2) Pre-Demolition Meeting**

The contractor shall schedule a pre-demolition meeting with DFO. The contractor shall:

- review existing conditions at the Place of the Project thoroughly to establish full extent of items to be removed, including footings, foundations, slabs, toppings, secondary floor finishes, and structures and items to remain. Commencement of demolition work will be considered to be acceptance of existing conditions at the Place of the Project and removal of such items.
- Examine adjacent properties to determine the extent of protection required.
- Prepare the description of the proposed demolition methods and procedures for the removal and disposal of indicated structures. To be submitted to DFO, and specifically include a schedule
  - Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
  - Interruption of utility services.
  - Coordination for shutoff, capping, and continuation of utility services.

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- Create an Inventory of items to be salvaged:
    - Prepare typewritten inventory of equipments, materials or any object DFO wants to be salvaged.

### **3) Waste Management and Disposal – Note on Asbestos**

The Contractor is to comply with the “construction waste management and disposal” and the “construction indoor air quality (IAQ) management” specifications attached to this package.

Asbestos: See attached report, no asbestos has been reported in the building to be demolished. Asbestos in the form of Vynil sheeting on the floor has been found in the nearby “Kitchen” building. If the contractor discovers asbestos during his work, DFO shall be informed immediately and all the appropriate measures taken.

### **4) Safety**

- Comply with CSA S350-M1980.
- Undertake the Work and effect arrangements required by authorities having jurisdiction for protection of public and workers.
- Post danger signs conspicuously around property.
- Provide a competent, experienced supervisor in charge of the work and present at the Place of the Project whenever work is in progress.
- Demolition of asbestos containing materials can be hazardous to health. Stop the Work and notify the Owner and Consultant immediately should material resembling spray or trowel-applied asbestos, which has not already been identified, be encountered in the course of demolition work. Do not proceed until written instructions have been received from the Owner and Consultant.
- Should any suspect PCBs or other hazardous materials be encountered which have not already been identified, stop the Work in the immediate area which may disturb suspect materials. Immediately report any suspect asbestos, PCBs or other hazardous materials, not previously identified, to the Owner and Consultant.

All work will require the use of vehicles, equipment such as hydraulic excavator, or machinery in condition suitable to the operation without risks of contamination with fuel, oil, grease, hydraulic fluid or any other pollutants. If, in the opinion of DFO representative, any of the contractor's equipment is in such condition as to present undue risk of oil, fuel or hydraulic leaks or spills, the contractor will need to repair it or replace it immediately.

### **5) Protection**

- Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades and parts of existing buildings to

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remain. Make good damage caused by demolition.

- Take precautions to support affected structures and, if safety of building being demolished or adjacent structures or services appears to be endangered, cease operations and notify DFO.
- Prevent debris from obstructing active services and drainage systems.
- Protect work to remain against damage. Repair or replace damaged work at no additional cost to DFO.

## **6) Execution:**

### **6.1 Examination**

- .1 Verify that utilities have been disconnected and capped.
- .2 Observe existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- .3 Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- .4 When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Consultant.

### **6.2 Selective demolition**

- .1 General: Demolish and remove existing construction only to the extent required by new construction, and as otherwise indicated. Use methods required to complete the work within limitations of governing regulations and as follows:
  - .1 If applicable, proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level
  - .2 Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
  - .3 Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - .4 Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
  - .5 Maintain adequate ventilation when using cutting torches.
  - .6 Remove decayed, infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

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- .7 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  - .8 Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  - .9 Dispose of demolished items and materials promptly.
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- .2 Dispose of demolished materials from Project site at a certified waste facility, or approved area by DFO or DFO Representative, except where noted otherwise and in accordance with authorities having jurisdiction. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - .3 Do not sell demolished material at the Place of the Project.
  - .4 Clean existing surfaces specified to receive new applied finishes to assure proper adherence.

### **6.3 Salvage**

- .1 Remove and store items indicated or directed for salvage. Remove, handle and transport such items to storage area approved by DFO, or to an area away from the Place of the Project and approved by DFO. Perform such work to prevent damage to the items during removal and in storage.
- .2 The Owner will review Place of the Project prior to commencement of demolition and instruct the General Contractor the items to be retained for re-use or be turned over to the Owner.
- .3 Remove and store indicated items for future use by Owner. Remove, handle and transport such items to storage area indicated in the Contract Documents or to an area within the Place of the Project designated by General Contractor. Perform such work carefully and with diligence to prevent any damage to the items during removal and in storage.

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**APPENDIX 1**

**PICTURES OF THE BUIDLING**



***Building Entrance***



***Building Foundation***



***Building Interior***



***Building Interior***





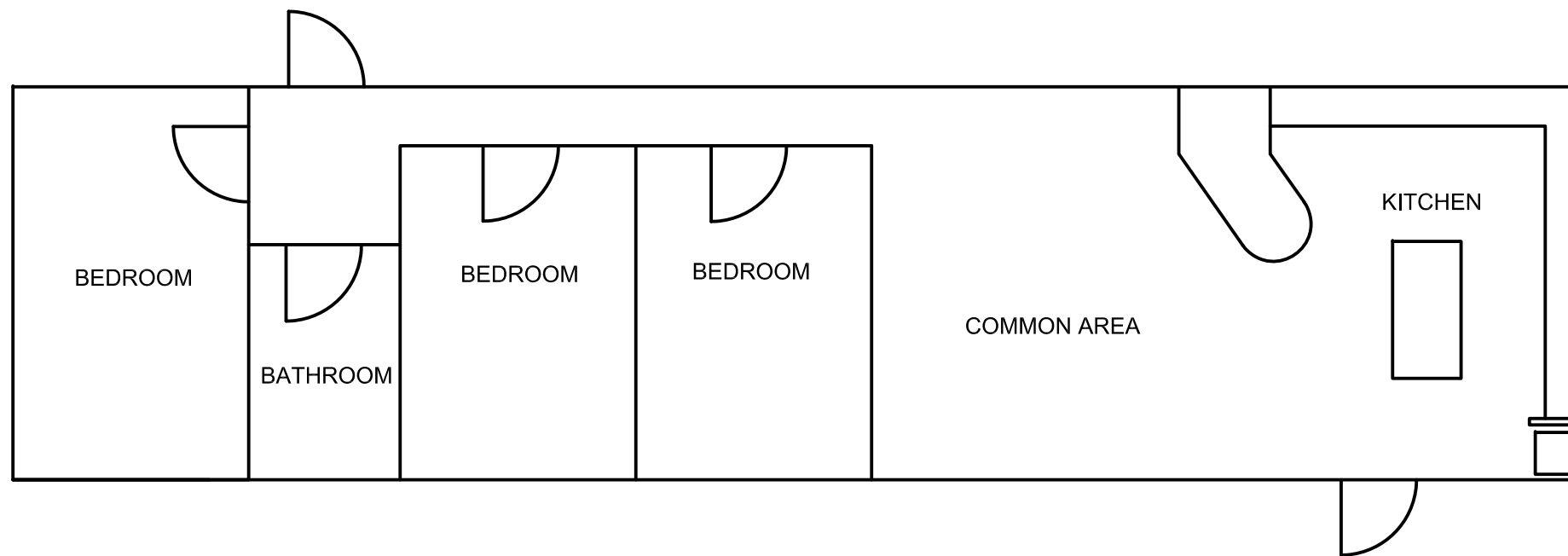
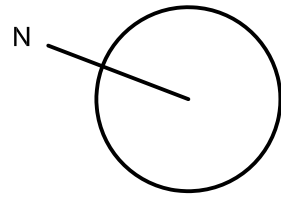
***Building Exterior***



***Building Exterior***

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***APPENDIX 2***  
***BUILDING FLOOR PLAN***



**BABINE COUNTING FENCE  
ATCO TRAILER  
APPROXIMATE FLOOR PLAN**

SCALE	NTS
DATE	----
DRAWING NUMBER	<b>001</b>
REVISION	

DESIGNED	----
DRAWN	----
CHECKED	KAP
RECOMMENDED	----
APPROVED	
APPROVED	

DWG. NO.	DRAWING REFERENCES	NOTES	NO.	DATE	REVISIONS

Produced by: Peta, Kevin, Fred, datta12, bar-18 Path: //resources/Drawings.dwg

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***APPENDIX 3***  
***SPECIFICATIONS***

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General Instructions

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## **PART 1 - GENERAL**

### **1.1 Laws, Notices, Permits and Fees**

- .1 The building code – National Building Code 2012, including amendments, shall govern the Work.
- .2 Comply with codes, by-laws, and regulations of authorities having jurisdiction over the Place of the Project. Codes and regulations form an integral part of the Contract Documents.
- .3 Contractor shall apply and pay for the building permit. The Contractor shall pick up building permit from the municipal department having jurisdiction at the Place of the Project. Obtain and pay for all other permits, licenses, deposits and certificates of inspection as part of the Work.
- .4 It is the responsibility of the Contractor to schedule notifications and inspections required by authorities having jurisdiction such that notifications can be properly received and that inspections can be properly undertaken without causing a delay in the Work. The Contractor, at no additional cost to , shall be solely responsible for any delay in the Work caused by failure to properly schedule required notifications and inspections.

### **1.2 Examination of the Place of the Project, Documents, Surfaces and Conditions**

- .1 Carefully examine the Place of the Project and investigate matters relating to the nature of the Work, means of access and egress, obstacles, rights and interests of other parties which may be interfered with during the execution of the Work, conditions and limitations including obstructions, existing structures or facilities, local conditions, actual levels, character and nature of the Work, and other consideration which may affect performance of the Work
- .2 Carefully examine the extent of work to be performed and matters which are referred to in the Contract Documents prior to start of the Work.
- .3 Do not commence work until unsatisfactory conditions are corrected. Commencement of work implies acceptance of surfaces and conditions and existing conditions will not be accepted as a contributing factor to subsequent failure or acceptability of the Work.

### **1.3 Discrepancies and Clarifications**

- .1 Advise DFO of discrepancies discovered in requirements of the Contract Documents and request clarification in written form.
- .2 Advise DFO when clarifications are required pertaining to meaning or intent of requirements of Contract Documents and request clarification from DFO in written form.
- .3 Do not proceed with related work until written clarification is provided by DFO.
- .4 Failure to notify DFO shall result in Contractor incurring responsibility for resulting deficiencies and expense at no additional cost to DFO.

### **1.4 Use of Premises and the Place of the Project**

- .1 Make good roads, soft landscaping, walkways, curbs, sidewalks, possessions and property, soiled or damaged due to the Work, to requirements of authorities having jurisdiction and requirements of Making Good, as applicable.
- .2 Fully protect adjacent site improvements, services, landscaping, and other works using

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General Instructions

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suitable covering and support framing, to prevent damage by construction related activities.

- .3 Curbs, concrete finishes and asphalt finishes should be sawcut to create a straight edge if required.

### **1.5 Security**

- .1 Contractor shall be responsible for security of the Place of the Project and material from time the Work commences until completion of the Work.
- .2 Contractor shall Provide and maintain signs, hoardings, guard-rails, barriers, warning lights and other protection as required by authorities having jurisdiction for safety of the Place of the Project. Contractor shall Be responsible for adequacy of protection.

### **PART 2 - PRODUCTS**

Not applicable.

### **PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

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Requests for Interpretation

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**PART 1 - GENERAL**

**1.1 Request for Interpretation – RFI**

- .1 An RFI shall not constitute notice of claim for a delay.
- .2 Submittal procedures:
  - .1 Submit RFIs sufficiently in advance of affected parts of the Work so as not to cause delay in the performance of the Work. Costs resulting from failure to do this will not be paid by the Contractor.
  - .2 RFIs shall be submitted only to DFO during the course of construction.
  - .3 RFIs shall be submitted only by Contractor. RFIs submitted by Trade Contractors or Suppliers shall not be accepted.
  - .4 DFO shall review RFIs from the Contractor submitted in accordance with this section, with the following understandings:
    - .1 DFO's response shall not be considered as a Change Order or Change Directive, nor does it authorize changes in the Contract Price or Contract Time or changes in the Work.
    - .2 Only DFO shall respond to RFIs. Responses to RFIs received from entities other than DFO shall not be considered.
  - .5 Allow 2 Working Days for review of each RFI by DFO.
    - .1 DFO's review of RFI commences on date of receipt by DFO of RFI submittal and extends to date RFI returned by DFO

**PART 2 - PRODUCTS**

Not applicable.

**PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

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Project Meetings

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**PART 1 - GENERAL**

**1.1 Administrative**

- .1 DFO shall schedule meetings in coordination with the Contractor and Engineer.
- .2 DFO shall prepare agendas for meetings in coordination with Contractor
- .3 DFO shall chair and record the minutes of meetings and shall distribute copies of minutes to Engineer, Contractor and all others in attendance.
- .4 The Contractor is responsible for preparing and distributing progress reports as requested containing updated schedules

**1.2 Pre-Construction Meeting**

- .1 DFO could schedule a pre-construction meeting within five (5) days after the date of commencement of the Contract and prior to commencement of activities at the Site.
- .2 Purpose: to discuss and resolve administrative procedures and responsibilities prior to the commencement of the Work, review personnel assignments, responsibilities, and administrative and procedural requirements, including site safety plans.
- .3 DFO, the Contractor, and site superintendent(s), will be in attendance.
- .4 Agenda of meeting will be sent out by DFO prior to the meeting.

**1.3 Progress Meetings**

- .1 DFO to schedule regular construction site meetings during the course of the Work.
- .2 Purpose: to monitor construction progress, and to identify problems and actions required for their solution to expedite the Work
- .3 Frequency: as determined by DFO and Contractor during the course of construction.

**1.4 Post-Construction Meeting**

- .1 Prior to application for completion of Contract, Contractor to schedule a post-construction meeting.
- .2 Purpose: to review and confirm the completion of the Contract

**PART 2 - PRODUCTS**

Not applicable.

**PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**



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Photographic Documentation

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**PART 1 - GENERAL**

**1.1 General**

- .1 Contractor shall provide photographic documentation in digital format and in accordance with procedures and submission requirements specified in this section.

**1.2 Digital Photographs**

- .1 Submit the photographs to DFO.
- .2 Documentation of compliance with the Contract Documents:
  - .1 Maintain a photographic record of the progress of the Work in sufficient detail to demonstrate compliance with the Contract Documents to be submitted for periodic review by DFO upon request. The Contractor shall provide physical verification of compliance with the Contract Documents and, in the case of enclosed or covered work, the Contractor shall be required to provide photographic demonstration of the item's completion to the satisfaction of DFO.
- .3 Additional requirements for photographic review by DFO:
  - .1 The work sequence may require additional review by photographic review to accommodate scheduling changes and unforeseen circumstances. At the sole discretion of DFO, and with prior arrangement, photographic review in lieu of field review of the Work may be warranted on this Project.

**PART 2 - PRODUCTS**

Not applicable.

**PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

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Temporary Facilities and Controls

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**PART 1 - GENERAL**

**1.1 General Instructions**

- .1 Arrange, obtain and pay cost for permits required for temporary facilities and controls.
- .2 Provide and maintain temporary facilities and controls for the Work and remove them from the Work upon issuance of certificate of Substantial Performance of the Work.
- .3 Arrange and pay for required temporary services, unless otherwise indicated by DFO.
- .4 Provide connection and disconnection of temporary services and facilities required in the Work, including connection to existing services made available by DFO.

**1.2 Existing Services and Facilities**

- .1 Do not use any existing services and facilities during construction unless specific written permission is provided by Owner.

**1.3 Temporary Sanitary Facilities**

- .1 Contractor shall provide and maintain temporary sanitary facilities for use by workers.
- .2 Use of existing building's sanitary facilities by workers is prohibited.

**1.4 Plant, Machinery and Scaffolding**

- .1 Contractors shall Provide scaffolding, equipment, tools, machinery and incidental appurtenances necessary for the proper execution of the Work.
- .2 Construction Manager and Trade Contractors shall erect plant, machinery and scaffolding to permit access to building and the Work.

**1.5 Site Storage**

- .1 Handle and store materials so as to prevent damage or defacement to the Work and surrounding property.
- .2 Refer to drawings and details for designated storage area at the Site. Contractor to receive approval from owner for use of other areas on the property.
- .3 Owner is not responsible for securing Products or materials at the Place of the Project.

**1.6 Protection of the Public**

- .1 Contractor shall Provide fencing, barricades, hoarding, notices and warning boards and maintain lights and signals for protection of workers engaged on the Work, for protection of adjoining property and for protection of the public.
- .2 Where any special hazard exists from which it is not possible to protect the public safety by other means, watchpersons shall be employed to preserve public safety until the area of special hazard no longer poses a risk to public safety.

**1.7 Protection of the Work**

- .1 Have damaged or defaced work corrected by workers meeting qualification requirements of the Contract Documents.

**1.8 Vehicle Cleaning**

- .1 Construction Manager shall establish a designated vehicle loading point at the Place of

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Temporary Facilities and Controls

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the Project to minimize tracking of soil off the Place of the Project. If the loading point becomes contaminated, it shall be cleaned and replaced.

- .2 Vehicles leaving the Place of the Project shall be cleaned of loose soil and dust, including tire washing, and sweeping or washing of exteriors and tailgates by a designated labourer.
- .3 Tarp vehicles containing indigenous soil or debris leaving the Place of the Project.

### **1.9 Control of Dust, Debris and Noise**

- .1 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .2 Control dust and dirt produced during the Work to prevent dispersion beyond the immediate work areas.
- .3 Prevent materials from contaminating air beyond application area, by providing temporary enclosures and ventilation/filtration.
- .4 Limit noise levels in accordance with requirements of authorities having jurisdiction or as instructed by DFO or Engineer.
- .5 Prevent abrasive-blasting, pressure-washing spray, and other extraneous materials from contaminating air beyond application area.

### **1.10 Traffic Control, Vehicle Access, and Road Maintenance**

- .1 Do not block roads or impede traffic. Keep construction traffic to designated roads only. Provide flag person to direct traffic as required.
- .2 Provide a hard surface area at the Place of the Project for cleaning down trucks prior to entry onto municipal roads or private roads outside of the Place of the Project.
- .3 Keep public and private roads free of dust, mud and debris resulting from truck, machinery and vehicular traffic related specifically to this Project, for the duration of Work.
- .4 Clean roads regularly, public or private. Wash down and scrape flush roads at least daily when earth moving operations take place. Maintain public property in accordance with requirements of authorities having jurisdiction.
- .5 Provide and maintain reasonable road access and egress to property fronting along or in vicinity of work under contract unless approved by DFO.

### **1.11 Parking**

- .1 A parking area has been designated for the use of workers engaged for the Project.
- .2 Throughout the Work, ensure that there is no interference with the operation of the existing premises, and that the existing parking areas and road systems remain free and clear of obstructions.
- .3 Illegally parked vehicles will be ticketed and/or towed at vehicle owner's expense, and at no additional cost to DFO.
- .4 All other parking areas will be paid parking.

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Temporary Facilities and Controls

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**1.12 Design and Safety Requirements for Temporary Facilities**

- .1 Be responsible for design, erection, operation, maintenance and removal of temporary structural and other temporary facilities. Engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform these functions where required by law or by the Contract Documents; and in cases where such temporary facilities and their method of construction are of such a nature that professional engineering skill is required to produce safe and satisfactory results.
- .2 Engage and pay for professional engineer(s) registered in Place of the Project to design and supervise construction and maintenance of hoardings, covered ways, protective canopies and project sign(s). Designs provided by DFO or Owner for such work cover general appearance only.

**1.13 Snow Removal**

- .1 Contractor to be responsible for continually keeping construction area free of snow to safely perform work complete in accordance with WCB Guidelines.

**PART 2 - PRODUCTS**

Not applicable.

**PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

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Warranties

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**PART 1 - GENERAL**

**1.1 General Instructions**

- .1 The procedures for completing Contract and acceptance by DFO or DFO Representative shall be in accordance with the methods prescribed by Contractor.
- .2 Stages will be reviewed at the Contract start-up meeting to ensure that parties understand their responsibilities.

**1.2 Final site condition documents:**

- .1 Contractor shall maintain 1 set of Contract Documents at the Place of the Project for the sole purpose of final condition documentation preparation.
- .2 Mark changes in red ink.
- .3 Contractor to produce As-Built Drawings with legal survey results including GPS coordinates. Provide legal survey results, including, but not limited to the following items:
  - .1 Location and elevation depth of all existing services and termination points
  - .2 Location and depth to top of all remaining timber piles and micropiles.

**PART 2 - PRODUCTS**

Not applicable.

**PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 Section Includes**

- .1 Demolition and removal of selected building and other components of the Work.
- .2 Salvaging of designated items for reuse by DFO.
- .3 Related mechanical and electrical work and demolition requirements.

### **1.2 Submittals**

- .1 Prior to commencement of the Work, prepare and submit to DFO for review the following items:
  - .1 Demolition Plan
    - .1 Drawings illustrating the means, methods and sequence of the Work
    - .2 Site plan showing location of Contractor work areas, storage, fencing, barricades, parking, trucking routes
    - .3 Demolition schedule with starting and ending dates activities including:
      - Selective demolition
      - interruption of utility services.
      - shutoff, capping, and continuation of utility services
  - .2 Site Safety Plan
    - .1 Site Safety Plan showing location of Contractor work areas, first aid station, emergency equipment, water service, washroom, fencing, parking, emergency access routes, emergency assembly area
  - .3 Truck Washing Plan
    - .1 Drawings detailing the location and equipment for washing vehicles
  - .4 Community Food Garden Protection Plan
    - .1 Protection Plan showing details of all measures (hoarding, fencing, signage, barricades, tarps, etc.) that will be used to protect the Community Food Garden from damage and contamination during the Work.
- .2 Contents and requirements of the noted submittals are the minimum required for DFO review. Contractor to confirm the requirements of the authority having jurisdiction for Building Permit application procedures.

### **1.3 Safety Requirements**

- .2 Comply with CSA S350-M1980.
- .3 Undertake the Work and effect arrangements required by authorities having jurisdiction for protection of public and workers.
- .4 Post danger signs conspicuously around property. Close doorways and thoroughfares giving access to area of demolition with barricades and hoarding as indicated or required.
- .5 Provide a competent, experienced supervisor in charge of the work and present at the Place of the Project whenever work is in progress.
- .6 Refer to "Hazardous Materials Survey of Capilano University P Building" as prepared by

ACM Environmental Corporation on November 18, 2016 for details of hazardous materials abatement and details including recommendations as found in section 4 of this report.

- .7 Refer to Section 02-80-00 of the project specifications as prepared by ACM Environmental Corporation for Asbestos Abatement specifications.
- .8 Should any suspect PCBs or other hazardous materials be encountered which have not already been identified, stop the Work in the immediate area which may disturb suspect materials. Immediately report any suspect asbestos, PCBs or other hazardous materials, not previously identified, to Engineer and DFO.

#### **1.4 Protection**

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, and adjacent grades. Make good damage caused by demolition.
- .2 Take precautions to support affected structures and, if safety of building being demolished or adjacent structures or services appears to be endangered, cease operations and notify DFO.
- .3 Prevent debris from obstructing active services and drainage systems.
- .4 Protect work to remain against damage. Repair or replace damaged work at no additional cost to DFO.

### **PART 2 - PRODUCTS**

Not applicable.

### **PART 3 - EXECUTION**

#### **3.1 Examination**

- .1 Verify that utilities have been disconnected and capped prior to demolition.
- .2 Observe existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- .3 Take inventory and record the condition of items to be removed and salvaged.
- .4 When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Notify DFO.
- .5 Survey of existing conditions of surrounding area: Record existing conditions by use of photographs in accordance with Section 01 32 33.

#### **3.2 Utility Services and Mechanical / Electrical Systems**

- .1 Coordinate work and any interruptions of services with Owner
- .2 Contractor is responsible for verifying site conditions including the exact location of mechanical and electrical systems. Contractor shall allow for all required services and costs associated with scanning and scope existing drainage services to confirm routing. No additional compensation will be given for extra work due to existing conditions, which such examination should have disclosed.
- .3 Report to DFO any unsatisfactory condition, which may adversely affect the proper completion of the Work.
- .4 The Contractor is responsible for isolating the mechanical systems if existing valves are not holding or not present and a section of piping can not be isolated.

### 3.3 Selective Demolition, General

- .1 General: Demolish and remove existing construction as indicated on drawings and specifications. Use methods required to complete the work within limitations of governing regulations and as follows:
  - .1 Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
  - .2 Maintain adequate ventilation when using cutting torches.
  - .3 Remove decayed, infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  - .4 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  - .5 Dispose of demolished items and materials promptly
- .2 Dispose of demolished materials from Project site at a certified waste facility, or approved area by DFO or DFO Representative, except where noted otherwise and in accordance with authorities having jurisdiction. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- .3 Do not sell demolished material at the Place of the Project.

### 3.4 Salvage

- .1 Deconstruct and/or remove and store items indicated or directed for salvage. Transport salvaged items to storage area within the Place of the Project designated by DFO. Perform such work to prevent damage to the items during removal and in storage.
  - .1 False Brick Façade
    - Salvage false brick façade and supporting steel structure and store to area within the Place of the Project designated by DFO.
    - Deconstruct false brick façade by saw cutting false brick façade into 4 ft x 16 ft panels.
    - Label each panel to facilitate future re-assembly.

**END OF SECTION**



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## ***APPENDIX 4***

**Pre-Renovation Hazardous Materials Inventory (Cascadia OHS) with Asbestos sample**

**Pre-renovations Hazardous Materials  
Inventory and Risk Assessment  
of the  
Babine Fish Fence Campsite  
Kilometer 60, FSR4000  
Regional District Bulkley Nechako, BC**



Prepared for

**Fisheries and Oceans Canada, Pacific  
Region**

Real Property, Safety & Security  
1110 – 401 Burrard Street  
Vancouver, BC V6C 3S4

**Attention:**

Kevin Pate, EIT  
Project Engineer



Unit #2 - 1962 Quinn St. South  
Prince George, BC V2N 1X5

## Executive Summary

Cascadia OHS was engaged by the Fisheries and Ocean, Pacific Region to carry out a **non-destructive** hazardous materials investigation of the various buildings at the Babine Fish Fence campsite located at Kilometer 60 on the Forestry Service Road 4000. This investigation was conducted to provide an inventory and quantity of the hazardous materials, as well as a risk assessment of the identified materials. All hazardous materials are to be encased, removed and/or abated prior to the scheduled renovations of the buildings. The purpose is to be in compliance with the WorkSafeBC Regulation 20.112 which states the employer must ensure a qualified individual inspects and catalogues any potential hazardous material prior to any renovations or demolition work.

## Hazardous materials

This investigation is intended to identify the locations and types of hazardous materials that are present in the building. All accessible areas of the buildings were inspected. Invasive sampling was carried out. Vermiculite was not observed.

The following hazardous materials were reviewed:

Material	Description	Recommendation
Asbestos	Sheet vinyl flooring	Personal protective equipment during renovations
Lead	Suspected paint on walls	Personal protective equipment during renovations
Silica	Assumed to be present in drywall filler / gyproc	Personal protective equipment during renovations
Mercury	None observed	No action necessary
Hantavirus - Rodent Droppings	Suspected in attic spaces	Personal protective equipment during renovations
Avian Guano	Observed on wood structure and attic spaces	Personal protective equipment during renovations
Radioactive Materials	None observed	No action necessary
Mould	Suspected; May be found in wall, floor and ceiling cavities	Personal protective equipment during renovations
PCBs	Fluorescent light fixtures	Separation & Proper Disposal
Ozone Depleting Substances	Refrigerators	No action necessary
Urea Formaldehyde Foam Insulation	None observed	No action necessary
Above Ground Storage Tanks (AGST)	Observed; propane / diesel	No action necessary
Other Materials	Paint, solvents, cleaning supplies	Separation & Proper Disposal

**Note:** Renovation or demolition activities will require protective measures. Materials may be encountered during work activities that are not identified in this report. If this happens, work must stop in those areas until the materials are properly identified.

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## 1.0 Introduction

Cascadia OHS was engaged by the **Fisheries and Ocean, Pacific Region** to carry out a **non-destructive** hazardous materials investigation of the various buildings at the Babine Fish Fence campsite located at Kilometer 60 on the Forestry Service Road 4000. This investigation was conducted to provide an inventory and quantity of the hazardous materials, as well as a risk assessment of the identified materials. All hazardous materials are to be encased, removed and/or abated prior to the scheduled renovations of the buildings. The purpose is to be in compliance with the WorkSafeBC Regulation 20.112 which states the employer must ensure a qualified individual inspects and catalogues any potential hazardous material prior to any renovations or demolition work.

This investigation is intended to identify the locations and types of hazardous materials that are present in the buildings (see Appendix A for photographs).

All requested and accessible areas of the buildings were inspected. Invasive sampling was carried out. Vermiculite was not observed.

Visual identification of hazardous materials was carried out. Representative samples of building materials were collected and analyzed for asbestos, lead in paint and leachable lead.

## 2.0 Hazardous Materials

Hazardous materials are present in a large number of common building materials. These materials must be managed effectively or removed to prevent exposure to workers and other persons. In situations where work activities, such as renovations and demolition, will affect hazardous materials, removal prior to the start of work or appropriate control measures must be implemented to ensure that workers are not exposed and contamination is not spread throughout the work and adjacent areas.

WorkSafeBC has established regulations regarding the handling and management of a number of hazardous materials along with guidelines for other hazardous materials. Other materials are regulated by environmental laws. The corresponding regulations and hazardous materials are indicated below.

Materials that must comply with WorkSafeBC regulations include:

1. Asbestos
2. Lead
3. Silica
4. Mercury
5. Hantavirus
6. Arsenic
7. Radioactive materials

Materials that WorkSafeBC has established guidelines for include:

1. Mould

Materials that must comply with environmental regulations:

1. Polychlorinated biphenyls
2. Ozone depleting substances
3. Urea formaldehyde foam insulation
4. Fuel oil storage tanks

## **2.1 Materials Subject to WorkSafeBC Regulations**

### **2.1.1 Asbestos**

Asbestos is a very common component of building materials. Most asbestos containing materials stopped being used in the early 1980s. However, due to the overflow of asbestos building materials during that time, WorkSafeBC has determined that buildings constructed up to 1990 may contain asbestos and must be inspected prior to the start of renovation or demolition activities.

Asbestos becomes a hazard when it is disturbed or becomes friable, causing airborne dust. Caution must be taken to ensure that asbestos containing materials are not disturbed. Asbestos exposure is known to have a number of health effects including asbestosis, lung cancer and mesothelioma.

Asbestos has been used in approximately 3,000 manufactured products and is commonly found in residential structures such as:

- Floor products (sheet flooring and floor tiles)
- Drywall filler compounds
- Plasters (usually in buildings constructed prior to 1930)
- Textured ceiling applications
- Duct tape (on heating system ducting and around forced air registers)
- Vermiculite
- Caulking and putties (on windows and doors and in levelling compounds)
- Cement products (siding and shingles as well as underground drainage pipes)
- Roofing felts and papers
- Pipe insulation (on piping, boilers and hot water tanks)

WorkSafeBC defines an asbestos containing material as containing 0.5% or more asbestos by weight. Vermiculite is considered to be asbestos containing if any asbestos is present. WorkSafeBC has designated asbestos as an ALARA substance. This means that exposure to this material must be kept “as low as reasonably achievable”. According to Section 5.54 of the Occupational Health and Safety Regulation (OHSR), employers are required to develop and implement an exposure control plan when workers may be exposed to airborne concentrations of asbestos greater than 50% of the exposure limit.

All asbestos waste must be handled, transported, and disposed of in accordance with current BCMOE regulations.

### **2.1.2 Lead**

Lead has been commonly used in paints and coatings. Coatings manufactured prior to 1950 are likely to contain high concentrations of lead. Residential paints manufactured after 1950 contain lower concentrations of lead. Residential paints manufactured after 1978 are unlikely to contain lead, however, industrial paints and coatings are still made with lead.

Lead becomes a hazard when painted surfaces are disturbed and airborne dust is created. Caution must be taken to ensure that lead containing materials are not disturbed. Exposure to lead is known to cause a number of health effects including damage to the central nervous system. Lead exposure also affects the uptake of oxygen in the blood and can accumulate in bones. Exposure can occur when lead products are touched and lead contamination is ingested, or inhaled.

Lead can be found in plumbing fixtures and solders. This may be found on plumbing lines and electrical equipment. Additionally, flashings and other products found on roofs may be made of pure lead.

WorkSafeBC has designated lead as an ALARA substance. This means that exposure to this material must be kept “as low as reasonably achievable”. Section 5.54 of the OHSR states that employers are

required to develop and implement an exposure control plan when workers may be exposed to airborne concentrations of lead greater than 50% of the exposure limit.

Waste materials painted with lead-based paint do not require special disposal requirements. However, lead paint that has been removed from building materials requires leachate testing to determine the appropriate method of disposal.

### **2.1.3 Silica**

Silica is one of the most common elements on earth. It is found almost everywhere. It appears in two (2) main forms - amorphous and crystalline. Generally, amorphous silica is not considered to be a significant hazard, however, crystalline silica is known to have a number of health effects including silicosis. Crystalline silica becomes a hazard when it is disturbed and airborne dust is created. Caution must be taken to ensure that silica containing materials are not disturbed.

Crystalline silica is present in a number of common building materials. These include:

- Plasters
  - Cement
- Stucco  
Drywall Filler Compounds

WorkSafeBC has designated crystalline silica as an ALARA substance. This means that exposure to this material must be kept “as low as reasonably achievable”. Section 5.54 of the OHSR states that employers are required to develop and implement an exposure control plan when workers may be exposed to airborne concentrations of crystalline silica greater than 50% of the exposure limit.

### **2.1.4 Mercury**

Mercury is a metal that is liquid at room temperatures and vaporizes at low temperatures. Mercury has a number of industrial uses and can be found in thermostats, thermometers and inside fluorescent light tubes.

Mercury has a significant toxic effect on the central nervous system and can cause disease or even death. Mercury becomes a hazard when it is released into the environment. Significant concentrations of mercury can be present at room temperature as it vaporizes at low temperatures. This can occur if mercury thermometers, thermostat bulbs, or fluorescent light tubes are broken.

WorkSafeBC has designated mercury as an ALARA substance. This means that exposure to this material must be kept “as low as reasonably achievable”. Section 5.54 of the OHSR states that employers are required to develop and implement an exposure control plan when workers may be exposed to airborne concentrations of mercury greater than 50% of the exposure limit.

All mercury waste requires disposal in accordance with current BCMOE requirements.

### **2.1.5 Hantavirus**

Hantavirus is associated with Hantavirus Pulmonary Syndrome. This disease is contracted by coming into contact with the droppings or urine of infected rodents. Hantavirus can also be contracted by being bitten or scratched by infected rodents.

WorkSafeBC states that employers are required to develop and implement an exposure control plan when workers may be exposed to potentially contaminated rodent droppings.

There are no special disposal requirements for animal droppings.

## **2.1.6 Arsenic**

Arsenic is a metal sometimes found in pesticides and pressure treated wood products.

Exposure can occur when arsenic containing materials are disturbed and dust becomes airborne. Sawdust from cutting pressure treated wood or fumes from burning these materials can result in significant airborne arsenic concentrations.

Disposal of arsenic waste must be in accordance with current BCMOE requirements.

## **2.1.7 Radioactive Materials**

Radioactive materials are commonly found in smoke detectors. A small amount of radioactive materials (<sup>241</sup>Americium) is sealed in a metal case inside smoke detectors. This metal case must remain undisturbed to prevent exposure to radioactive materials.

Some ceramic tiles and forms of granite have also been found to contain radioactive materials. Radon is a naturally occurring gas created during the decay of other radioactive materials. Northern British Columbia has been considered an area for concern..

Waste smoke detectors must be disposed of in accordance with Canadian Nuclear Safety Commission requirements.

## **2.2 Materials Subject to WorkSafeBC Guidelines**

### **2.2.1 Mould**

Mould is prevalent throughout our environment. Mould occurs naturally as their spores are present everywhere; it is nature's way of breaking down and recycling materials. Growth of mould requires spores, moisture, and a food source. Water leaks (even very minor leaks) and moisture accumulation are usually sufficient for mould to begin growing.

Exposure to mould spores most often results in allergy-type responses in susceptible individuals. These are similar to "hay-fever" and can include runny eyes and noses, and throat irritation. In more extreme cases, exposure to mould spores can result in "pneumonia-like" responses.

WorkSafeBC has not established exposure levels for airborne mould spores. WorkSafeBC does provide guidelines for dealing with mould contamination. These guidelines are included in the Indoor Air Quality regulation guidelines.

There are no special disposal requirements for mould waste.

## **2.3 Materials Controlled by Environmental Regulations**

### **2.3.1 Polychlorinated Biphenyls**

Polychlorinated biphenyls (PCBs) are regulated by both Provincial and Federal regulations. Fluorescent light ballasts containing PCBs must be treated as PCB waste and stored and disposed of in accordance with current regulations. Fluorescent light fixtures removed during demolition, construction, or maintenance activities must be inspected for the presence of PCBs.

Each ballast identified as PCB-containing must be sent to a licenced facility in accordance with current regulatory requirements.

### **2.3.2 Ozone Depleting Substances**

Ozone depleting substances (ODS) and chlorofluorocarbons are commonly found in older refrigerators and air conditioning units, and sometimes found in fire suppression systems.

Environmental regulations restrict the release of these compounds into the environment. If systems or equipment containing ODS are set for disposal, they must be recycled or disposed by a licenced contractor.

### **2.3.3 Urea Formaldehyde Foam Insulation**

Urea formaldehyde foam insulation (UFFI) was previously used as a retrofit insulation in older buildings. The expanding foam was sprayed into wall and ceiling cavities to provide additional insulation.

Over time, the insulation can break down and release formaldehyde gas when exposed to moisture. UFFI was most commonly used in residential settings and many older buildings contain UFFI. The use of this insulating material was banned in 1978.

There are no special disposal requirements for UFFI waste.

### **2.3.4 Fuel Oil Storage Tanks**

Fuel oil storage tanks (above and below ground) are found in many houses and commercial buildings. The tanks can corrode and leak as they age. Spills often occur during tank filling and cause contamination to the surrounding ground.

Tanks in use must be monitored to ensure that spillage and contamination does not occur. Tanks no longer in use must be removed for disposal and the surrounding must be soil checked for contamination.

### **2.3.5 Leachable Metals**

The BCMOE regulates the disposal of some waste materials based on the leachability of metals and other compounds from the waste. Toxicity Characteristic Leaching Procedure (TCLP) analysis is used to determine if the waste is characterised as hazardous due to its leachability. The BCMOE defines hazardous waste as metals containing 5.0 mg/L or greater.

Testing may have to be carried out on materials removed from the building before they can be disposed. This will depend on where the waste facility.

### **2.3.6 Other Materials**

Many hazardous materials may be present in a building that will be affected by renovations or demolition. These can include:

- Propane or butane cylinders
- Paint
- Solvents
- Toxic or corrosive products
- Other flammable materials

## **3.0 Results and Recommendations**

The commercial building was inspected for the presence of a variety of hazardous materials. WorkSafeBC requirements specify that precautions are necessary when handling these materials. These will depend on the disposition of each hazardous material.

Trained, qualified contractors need to be hired to carry out remedial work on hazardous materials. All demolition work should be carried out by workers wearing respirators and disposable coveralls.

Copies of this report must be provided to contractors engaged to work in the building.

Notices of Project must be submitted in accordance to WorkSafeBC requirements.

Materials may be encountered during work activities that are not identified in this report. If this occurs, work must stop in those areas until the materials are properly identified.

### 3.1 Asbestos

With the current changes in the WorkSafeBC regulations, the requirement for representative sampling was utilized based on WorkSafeBC guidelines. Cascadia collected four (4) bulk samples of building materials typically suspected of containing asbestos for analysis. These materials include drywall joint compound, texture coat, insulation, stucco and flooring. All the bulk samples were analyzed at the in-house laboratory of Cascadia OHS in accordance with the National Institute for Occupational Safety and Health (NIOSH) Analytical Method 9002, "Asbestos (bulk) by Polarized Light Microscopy."

Table 1 summarizes Cascadia's findings and for the complete lab analysis, please see Appendix B.

**Table 1 - Identified Asbestos Bulk Samples**

Sample No.	Location	Material	Asbestos (%)
784-1	Kitchen/Laundry – Bathroom #1 – Flooring – Base layer	Sheet vinyl flooring	Chrysotile 35%

**A partial visual inspection of all accessible areas was conducted. Vermiculite insulation was not observed. This material may still exist in areas not inspected beneath insulation or within false ceilings. Vermiculite may also exist within wall cavities. If discovered, the material should be tested for the presence of asbestos.**

Prior to the performance of any work that may disturb asbestos containing materials it is a regulatory requirement that a qualified person perform a Risk Assessment. This requirement is in compliance with the WorkSafeBC Occupational Health & Safety Regulation *Part 6 "Substance Specific Requirements"*; specifically Section 6.6 subsections (1), (2), (3), & (4).

The asbestos-containing sheet vinyl flooring was found on the main level. The extent of the flooring was observed in the following area:

- Kitchen / Laundry – Bathroom #1 – Base layer

There is approximately 72 square feet of sheet vinyl flooring. The flooring is in relatively good condition, with minor damage and delamination.

The removal of **asbestos sheet vinyl flooring** should be conducted using **Modified High Risk** asbestos abatement procedures. These procedures must be utilized by a qualified contractor and include as a minimum requirement:

- HEPA-equipped Powered air purifying respiratory (PAPR) protection and disposable Tyvek coveralls;
- Application of water to the asbestos debris materials being disturbed;
- Isolation of the work area;
- HEPA equipped negative air unit for dust suppression purposes;

- Filing of a “Notice of Project” with WorkSafeBC prior to significant disturbance of asbestos-containing materials;
- Shower system and;
- Air monitoring as per WorkSafeBC requirements.

Asbestos cement piping was sometimes used for perimeter drains, storm drains and sewer lines. Asbestos cement piping was not observed but may be buried on the property.

### 3.2 Lead

No lead sampling was taken during the current investigation.

The currently allowable level of lead in paint is set by Health Canada under the Canada Consumer Protection Act, Surface Coating Materials Regulation (SOR 2005-09). Under this regulation the maximum allowable concentration of lead in paint sold to consumers is 0.009% (90 µg/g).

In accordance to WorkSafeBC, any product containing any level of lead is considered to be lead containing and a potential health hazard. For any lead containing product, an abatement risk assessment is required prior to any removal of the product.

Any untested painted surfaces are presumed lead-containing unless sampled and found to be non-lead containing. Lead may be present as solder on any remaining plumbing systems or other fixtures, such as flashing or roof vents. For removal of other hazardous materials, including lead-based paint, an employer is required to develop work procedures that will minimize their worker’s risk of exposure as per Section 5 of the OHSR. Both the supervisor and worker must be properly trained in handling the material, including cleanup and disposal.

**A Lead Exposure Control Plan is recommended for contractors working with lead-based containing materials, including site specific work procedures prior to any work.**

Precautions must be put in place during demolition and renovation activities to ensure that workers are not exposed to lead containing dust and debris. Flashings can be removed and recycled. In order to control worker exposure to lead paint particulate, any cutting, burning, grinding, sanding or other disturbance of identified lead painted surfaces should be conducted following appropriate safe work procedures.

As procedures vary depending on the nature of the work, the following must be considered as a minimum:

- Use of Half face respirators equipped with P100 class filters, disposable Tyvek™ or equivalent coveralls and work gloves;
- Segregation of the work area by the use of barrier tape and warning placards;
- Use of drop sheets and tarps to prevent spread of lead-containing dust;
- Use of HEPA filter equipped vacuum cleaner(s);
- Thorough washing before eating, drinking or smoking;
- Application of water to the materials being disturbed;
- Filing of a “Notice of Project” with WorkSafeBC prior to significant disturbance of lead-containing paint; and
- Air monitoring during significant disturbance of lead-containing paint.

Under the BC Hazardous Waste Regulation materials with identified lead-based paint destined for disposal at a licensed landfill facility must be tested for leachability to determine if they should be handled as a hazardous waste.

### 3.3 Silica

Silica testing was not carried out, but this material will be present in the gyproc / drywall.

Precautions must be put in place during renovations or demolition activities to ensure that workers are not exposed to silica containing dust and debris. **It is recommended that contractors working with silica-based containing materials have a Silica Exposure Control Plan in place including site specific work procedures prior to work commencing.**

In order to control worker exposure to silica dust, any abrasive blasting, jackhammering, chipping, drilling, cutting, sawing, or other disturbance of identified concrete, plaster or drywall walls or ceilings should be conducted following appropriate safe work procedures.

As procedures vary depending on the nature of the work, the following must be considered as a minimum:

- Use of Half-face respirators equipped with P100 class filters, disposable Tyvek™ or equivalent coveralls and work gloves;
- Continuous application of water spraying to materials being disturbed;
- Use of drop sheets and tarps to prevent spread of silica-containing dust;
- Use of HEPA filter equipped vacuum(s);
- HEPA equipped negative air unit for dust suppression purposes (recommended); and
- Air monitoring as per WorkSafeBC requirements.

### 3.4 Mercury

No temperature control thermostats were observed. Should any thermostats with mercury ampoule be uncovered, the units with mercury ampoule(s) must be removed and disposal of properly when the units are taken out of service.

### 3.5 Hantavirus (and other Animal Droppings)

Avian droppings were observed on the surfaces of the cabins and are suspected in the attic spaces of the buildings. It is recommended that all personnel conducting work in this area, at a minimum, wear and use the following:

- Half face respirator fitted with HEPA filtered P100 cartridges
- Disposable suits and impermeable gloves and eye protection
- HEPA filtered negative air cabinets
- HEPA filtered vacuums.

**WorkSafeBC regulation requires that contractors handling/cleaning animal and rodent feces have a Hantavirus Exposure Control Plan in place including site specific work procedures prior to work commencing.**

### 3.6 Arsenic

Pressure treated wood was not observed on the site.



### 3.7 Radioactive Materials

Smoke detectors were observed in the buildings but not in the cabins. The smoke detector units may contain a radon chip within the compartment. These materials must be removed for disposal when the units are taken out of service.

### 3.8 Mould

Airborne fungal spores originate from many sources, most of which are located outdoors, such as decaying leaves or disturbed soil. Levels of fungal spores outdoors can reach levels well over 100,000 spores per cubic meter (spores/m<sup>3</sup>). In healthy indoor environments the levels of fungal spores indoors should be less than the level detected outdoors. In buildings with doors and windows that are opened regularly, such as schools and homes, the levels of fungal spores indoors are often similar to the levels detected outdoors. In buildings with filtered ventilation systems, such as large office buildings, the levels indoors are normally much lower than the levels outdoors. However, if fungi have colonized building materials there may be higher concentrations of spores identified indoors and they may be different than those found outdoors.

During the site investigation of the various buildings, the following observations were made:

#### Sleeping Quarters / Office

Dried water marks and staining were observed along the perimeter of the trailer hallway and bathroom. Suspected fungal growth found in sink cabinet of the bathroom as well as sections of wood rot along the roof structure (see photos in appendix A). In addition, there is a faint but noticeable stale, musty and mildew-like odour in the open area with the living room and kitchen.

#### Kitchen / Laundry Building

Dried water marks and staining were observed around the intersection of the ceiling and vent stack as well as sporadic fungal growth on the backing of the sheet vinyl flooring in the laundry room.

#### Cabins

There is a healthy population of barn swallows (family Hirundinidae) that are nesting in the attic spaces of the cabins along the riverbank. These birds are adapted to aerial feeding of the abundance of insects in the immediate area. As a result, there is a build-up of avian guano on the roofing structures and wood floor boards (see photo in Appendix A). In addition, there are carapaces and living versions of stoneflies (order Plecopterans) found in the cabins. With optimal water quality of the Babine River and food resources, the population is healthy and active as the insects are seen in and around the walls of the cabins.

#### **Spore Trap Sampling**

Spore trap samples were collected using AllergencoD spore trap cassettes (manufactured by Environmental Monitoring Systems) connected to a calibrated ZEFON Bio-pump sampling pump. Sampling was conducted for 5 minutes at a flow rate of 15 litres per minute, for a total sampling volume of 75 liters per sample. Spore sampling cassettes were analyzed by a third-party laboratory, EMSL Analytical in Burnaby.

#### **Results**

The profile of the total airborne fungal spore concentrations inside of the various structures had ranged from 2,830 spores/m<sup>3</sup> to 6,890 spores/m<sup>3</sup>, compared to a concentration of 12,290 spores/m<sup>3</sup> recorded outdoor. The outdoor (ambient) have been hi-lighted in green in Table 1 (see Appendix B). There were high concentrations of *Aspergillus-Penicillium-like* and *Cladosporium* as well as low to moderate concentrations of *Cladosporium*, *Ganoderma*, *Myxomycetes*, and *Rusts* spores detected in the interiors of the various structures in comparison to the outside sample. These spores have been hi-lighted in red font in Table 1 (see Appendix B). This may indicate that further investigation is recommended to determine the extent of the fungal contamination indoors.

In addition, there were trace concentrations of *Botrytis*, *Pithomyces*, *Ulocladium* and *Unidentified* spores were detected in the samples that was not detected on the ambient (exterior) sample. These spores have been hi-lighted in yellow in Table 1 (see Appendix B). Please refer to Appendix B for a copy of the laboratory report.

**Table 1-1: Fungal Spores in Air – Sampling Results**

Organism (Fungi) Type	784-1 Ambient Centre of Campsite (spores/m <sup>3</sup> ) <sup>1</sup>	784-2 Trailer – Sleeping Quarters Meeting Room (spores/m <sup>3</sup> ) <sup>1</sup>	784-3 Kitchen / Rec Room TV Room (spores/m <sup>3</sup> ) <sup>1</sup>
<i>Ascospores</i>	1,600	1,000	800
<i>Aspergillus-Penicillium-like</i>	100	200	1,100
<i>Basidiospores</i>	10,200	3,500	3,000
<i>Cladosporium</i>	300	1,400	90
<i>Ganoderma</i>	40	-	-
<i>Myxomycetes</i>	40	40	40
<i>Pithomyces</i>	-	10	-
<i>Rusts</i>	10	-	-
<i>Ulocladium</i>	-	10	-
<i>Unidentified spores</i>	-	-	40
<i>Botrytis</i>	-	-	-
<b>TOTAL</b>	<b>12,290</b>	<b>6,160</b>	<b>5,070</b>

Notes:

1. Spores/m<sup>3</sup> refers to the concentration all fungal structures counted by the lab.
2. If no value is reported, the concentration for that spore type was less than the detection limit of analysis.

**Table 1-2: Fungal Spores in Air – Sampling Results**

Organism (Fungi) Type	784-1 Ambient Centre of Campsite (spores/m <sup>3</sup> ) <sup>1</sup>	784-4 Cabin #1 (spores/m <sup>3</sup> ) <sup>1</sup>	784-5 Cabin #2 (spores/m <sup>3</sup> ) <sup>1</sup>	784-6 Cabin #3 (spores/m <sup>3</sup> ) <sup>1</sup>	784-7 Sleeping Quarters #4A (spores/m <sup>3</sup> ) <sup>1</sup>	764-5 Sleeping Quarters #4B (spores/m <sup>3</sup> ) <sup>1</sup>
<i>Ascospores</i>	1,600	710	580	890	1,100	490
<i>Aspergillus-Penicillium-like</i>	100	200	200	200	40	40
<i>Basidiospores</i>	10,200	3,200	2,200	3,200	4,930	2,100
<i>Cladosporium</i>	300	490	1,000	400	760	200
<i>Ganoderma</i>	40	200	40	-	40	-
<i>Myxomycetes</i>	40	90	400	-	10	-
<i>Pithomyces</i>	-	-	-	-	-	-
<i>Rusts</i>	10	-	40	-	10	-
<i>Ulocladium</i>	-	-	-	-	-	-
<i>Unidentified spores</i>	-	-	-	-	-	-
<i>Botrytis</i>	-	40	-	-	-	-
<b>TOTAL</b>	<b>12,290</b>	<b>4,930</b>	<b>4,460</b>	<b>4,690</b>	<b>6,890</b>	<b>2,830</b>

Notes:

1. Spores/m<sup>3</sup> refers to the concentration all fungal structures counted by the lab.
2. If no value is reported, the concentration for that spore type was less than the detection limit of analysis.

Cascadia recommends that a destruction assessment and fungal remediation be conducted to determine the extent and level of fungal contamination behind the walls, ceiling and flooring cavities. Fungal contamination may be present within wall or ceiling cavities. During any renovations or demolition activities, precautions must be taken to ensure that workers are not exposed to potential mould spores. All personnel conducting work in this area, at minimum, are recommended to wear and use the following:

- Half face respirator fitted with HEPA filtered P100 cartridges
- Disposable suits, impermeable gloves, and eye protection
- HEPA filtered negative air cabinets and HEPA filtered vacuums.

### **3.9 Polychlorinated Biphenyls**

Due to the age of the buildings, there may be suspect PCB-containing light ballasts of the fluorescent strip light fixtures that are found throughout. If PCBs are present the ballasts must be transported to an acceptable waste storage facility.

### **3.10 Ozone Depleting Substances**

Refrigerators were observed in the kitchen area. There may be appliances in the remainder of the campsite. Any older appliances should have the vapours and gases be removed prior to final disposal.

### **3.11 Urea Formaldehyde Foam Insulation**

Urea formaldehyde foam insulation was not observed in the buildings.

### **3.12 Fuel Oil Storage Tanks**

Fuel oil storage tanks (above ground or underground) was observed during the investigation.

### **3.13 Leachable Metals**

Leachable lead testing was not carried out during the field sampling. Suspected leachable lead products may exist in the building and will be required to be sampled and analyzed for TCLP lead leachate. The determination of the sample concentration are for BCMOE's Limit for Hazardous Waste and to determine the method of final disposal.

The BCMOE regulates the disposal of some waste materials based on the leachability of metals and other compounds from the waste.

Under the BC Hazardous Waste Regulation materials with lead paint concentrations over 0.01 wt% (100 ppm) destined for disposal at a licensed landfill facility must be tested for leachability to determine if they should be handled as a hazardous waste.

Consult the waste disposal facility for disposal requirements prior to disposal. Prior to demolition it is the responsibility of the client or the contractor to have samples collected by a qualified person and analyzed using the toxicity characteristic leachate procedure (TCLP).

### 3.14 Other Materials

The following miscellaneous hazardous materials were identified on the property: stored paints, solvents, and cleaning supplies were found in various locations of the campsite.

These materials should be safely removed from the site for disposal, or recycling, in accordance with current regulations prior to any renovations activities.

### 3.14 Abatement

#### Clearance Documentation

In order to comply with BC Workers Compensation Board Occupational Health & Safety Regulation Part 20.112(8) a qualified person (Cascadia OHS) must conduct a final inspection after all of the hazardous materials identified in this report have been safely contained or removed. Once all of the hazardous materials have been removed and the final inspection has been completed, a written clearance letter can be provided.

Should asbestos abatement be undertaken by unqualified persons, the work area will require aggressive air clearance sampling. This air sampling will extend to any adjacent areas that have not been isolated from the hazard and potential contamination. Clearance letters required to document removal of asbestos for issuance of building permits and contractors hired to work in the space will not be granted subject to failure of this testing. The owner/client is responsible for the additional fees incurred for these services.

### 4.0 Closure

This document was prepared for the exclusive use of our client, **Fisheries and Ocean, Pacific Region**. All conclusions and recommendations are based upon conditions at the site at the time of this investigation. All conclusions and recommendations are based upon professional opinions. These opinions are in accordance with accepted industrial hygiene assessment standards and practices and comply with current WorkSafeBC requirements.

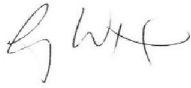
All conclusions and recommendations made in this report are based on conditions at the time of inspection. Changes may occur over time that will require a re-evaluation of the site.

All work was carried out based on the Scope of Work that was agreed upon with the client prior to the start of work, constraints imposed by the client, and availability of access to the site. A Stage 1 Preliminary Site Investigation was not part of the scope of work.

No warranty or guarantee, whether expressed or implied, are made with respect to the data or the reported findings, observations, and conclusions, which are based solely upon site conditions at the time of the investigation.

This report may not be used, relied upon, copied, published, or quoted by any party without the written consent of Cascadia OHS. Other parties reading this report must independently verify the completeness and accuracy of this report and its contents.

This report is not intended as a Scope of Work for tender or bidding purposes. Any use of this report in that fashion is at the sole discretion and liability of the Owner.



Glenn Wong, DTech Chem  
Regional Manger  
Field & Report

## Appendix A: Photographs



<b>Photo 1</b>	<b>Date:</b> July 13, 2017	<b>Location:</b> BFF Campsite - Trailer
<b>Description:</b> View of the main entrance of the Sleeping Quarters / Office trailer.		



<b>Photo 2</b>	<b>Date:</b> July 13, 2017	<b>Location:</b> BFF Campsite - Kitchen
<b>Description:</b> View of the building housing the kitchen, laundry and bathroom facilities.		



<b>Photo 3</b>	<b>Date:</b> July 13, 2017	<b>Location:</b> BFF Campsite - Cabins
<b>Description:</b> View of the three cabins along the river bank.		



<b>Photo 4</b>	<b>Date:</b> July 13, 2017	<b>Location:</b> BFF Campsite - Kitchen
<b>Description:</b> View of the built-up flooring with asbestos sheet vinyl flooring as base layer in bathroom #1.		



<b>Photo 5</b>	<b>Date:</b> July 13, 2017	<b>Location:</b> BFF Campsite - Trailer
<b>Description:</b> View of the perimeter surface staining of the ceiling. Cause is water seepage through the roof.		



<b>Photo 6</b>	<b>Date:</b> July 13, 2017	<b>Location:</b> BFF Campsite - Trailer
<b>Description:</b> View of the bathroom sink cabinet; suspect fungal growth on surface of cabinet.		





<b>Photo 7</b>	<b>Date:</b> July 13, 2017	<b>Location:</b> BFF Campsite - Kitchen
<b>Description:</b> View of the suspect fungal growth on ceiling tiles in Laundry Room.		



<b>Photo 8</b>	<b>Date:</b> July 13, 2017	<b>Location:</b> BFF Campsite - Cabins
<b>Description:</b> View of the openings of the roof structure allowing for avian nesting.		



<b>Photo 9</b>	<b>Date:</b> July 13, 2017	<b>Location:</b> BFF Campsite - Cabins
<b>Description:</b> Typical view of the built-up avian guano on the wooden steps of the cabin.		



<b>Photo 10</b>	<b>Date:</b> July 13, 2017	<b>Location:</b> BFF Campsite - Cabins
<b>Description:</b> Typical view of the living and dead stoneflies found inside of the cabins.		

# **Appendix B**

## **Laboratory Results**

**Asbestos Bulk Analysis – Cascadia OHS**

**Fungal spore trap – EMSL Canada Laboratories**



# Bulk Sample Report

Project #: 784  
 Client: Department of Fisheries and Oceans  
 Site: Babine Fish Fence Campsite  
 PO#:

Sampled by: GW  
 Date Sampled: 13-Jul-17  
 Analyst: GW

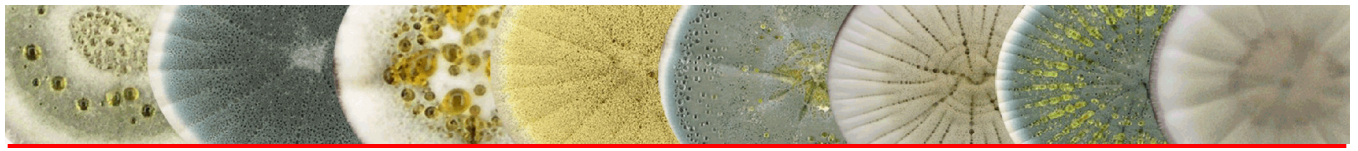
1962 Quinn St. South  
 Prince George, BC  
 250.563.8484  
 gwong@cascadiaohs.ca

Sample #	Location	Material	Analysis Date	Layer	Description	%	Asbestos	%	Other Materials	%
1	Main floor Kitchen – Bathroom #1	Sheet vinyl flooring	15-Jul-17	1	Blue & grey pattern vinyl	15	None detected	-	Non-fibrous	100
				2	Black cementitious backing	35	None detected	-	Non-fibrous	100
				3	Beige pattern vinyl	10	None detected	-	Non-fibrous	100
				4	White sponge	20	None detected	-	Non-fibrous	100
				5	Brown fibre backing	20	Chrysotile	35	Cellulose Non-fibrous	20 45
2	Main floor Kitchen – Bathroom #2	Sheet vinyl flooring	15-Jul-17	1	Tan pattern vinyl	20	None detected	-	Non-fibrous	100
				2	White sponge	45	None detected	-	Non-fibrous	100
				3	Tan fibre backing	35	None detected	-	Cellulose Non-fibrous	65 35
3	Main floor Kitchen – Laundry	Sheet vinyl flooring	15-Jul-17	1	Beige pattern vinyl	30	None detected	-	Non-fibrous	100
				2	White sponge	35	None detected	-	Non-fibrous	100
				3	Beige fibre backing	35	None detected	-	Cellulose Non-fibrous	25 75
4	Main floor Sleeping Quarters – Bathroom	Sheet vinyl flooring	15-Jul-17	1	Tan & yellow pattern vinyl	20	None detected	-	Non-fibrous	100
				2	Tan sponge	60	None detected	-	Non-fibrous	100
				3	Beige vinyl	20	None detected	-	Non-fibrous	100

---

## ***APPENDIX 5***

### **5. Expanded Fungal report (EMSL)**

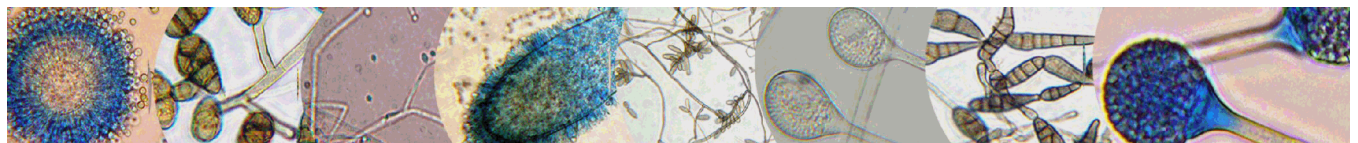


# EXPANDED FUNGAL REPORT <sup>TM</sup>

## Prepared Exclusively For

Cascadia OHS  
1962 Quinn St. South  
Unit #2  
Prince George, BC V2N 1X5  
Phone:250-563-8484

**Report Date:** 7/20/2017  
**Project:** 784  
**EMSL Canada Orde** 691701443



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## EMSL Canada Inc.

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**Attn:** Glenn Wong  
Cascadia OHS  
1962 Quinn St. South  
Unit #2  
Prince George, BC V2N 1X5

**Proj:** 784

EMSL Order: 691701443  
Customer ID: 55CSCD42  
Collected: 7/13/2017  
Received: 7/17/2017  
Analyzed: 7/20/2017

### 1. Description of Analysis

#### Analytical Laboratory

EMSL Canada Inc. (EMSL Canada) is a nationwide, full service, analytical testing laboratory network providing Asbestos, Mold, Indoor Air Quality, Microbiological, Environmental, Chemical, Forensic, Materials, Industrial Hygiene and Mechanical Testing services. Ranked as the premier independently owned environmental testing laboratory in the nation, EMSL Canada puts analytical quality as its top priority. This is assured by our high quality personnel, including experienced microbiologists with graduate degrees. Our quality system is based on internationally accepted criteria for competence (ISO/IEC 17025:2005).

EMSL Canada is an independent laboratory that performed the analysis of these samples. EMSL Canada did not conduct the sampling or site investigation for this report. The samples referenced herein were analyzed under strict quality control procedures using state-of-the-art microbiological methods. The analytical methods used and the data presented are scientifically and legally defensible.

The laboratory data is provided in compliance with the ISO 17025 standard for the particular test(s) requested, including any associated limitations for the methods employed. These data are intended for use by professionals having knowledge of the testing methods necessary to interpret them accurately.



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Collected: 7/13/2017  
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**Proj:** 784

### Air Samples - Spore traps:

Spore traps are commercially available sampling devices that capture airborne particles on an adhesive slide. Air is pulled through the device using a vacuum pump. Spores, as well as other airborne particles, are impacted on the collection adhesive. Using spore trap collection methods has inherent limitations. These collection methods are biased towards larger spore sizes.

The analysis for total spore counts is a direct microscopic examination and does not include culturing or growing the fungi. Therefore, the results include both viable and non-viable spores. Some fungal groups produce similar spore types that cannot be distinguished by direct microscopic examination alone (i.e., *Aspergillus/Penicillium*, and others). Other spore types may lack distinguishing features that aid in their identification. These types are grouped into larger categories such as Ascospores or Basidiospores.

Fungal spores are identified and grouped by morphological characteristics including color, shape, septation, ornamentation, and fruiting structures (if present) which are compared to published mycological identification keys and texts. EMSL Canada reports provide spore counts per cubic meter of air to three significant figures. Please note that each spore category is reported to three significant figures. Due to rounding and the application of three significant figures the sum of the individual spore numbers may not equal the total spore count on the report. EMSL Canada does not maintain responsibility for final volume concentrations (counts/m<sup>3</sup>) since this volume is provided by the field collector and can not be verified by EMSL Canada.

EMSL Canada analyzes spore traps using phase contrast microscopy. There is a wide choice of collection devices (Air-O-Cell, Micro-5, Burkhard, etc.) on the market. Differences in analytical method may exist between spore trap devices.

Spore trap results are reported in spores per cubic meter of air. Due to the other airborne particles collected with the spores, EMSL Canada reports a background particle density. Background density is an indication of overall particulate matter present on the sample (i.e. dust in the air). High background concentrations may obscure spores such as the *Penicillium/Aspergillus* group. The rating system is from 1-5 with 1 = 1 - 25% of the background obscured by material, 2 = 26 - 50%, 3 = 51 - 75%, 4 = 76% - 99%, 5 = 100% or overloaded. A background rating of 4 or higher should be regarded as a minimum count since the actual concentrations may be higher than those reported. EMSL Canada will not be held responsible for overloading of samples. Sample volumes are left to the discretion of the company or persons conducting the fieldwork.

Skin fragment density is the percentage of skin cells making up the total background material, 1 = 1 - 25%, 2 = 26 - 50%, 3 = 51 - 75%, 4 = 76-100%. Skin fragment density is

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considered an indication of the general cleanliness in the area sampled. It has been estimated that up to 90% of household dust consists of dead skin cells.

### 2. Analytical Results

See attached data reports and charts.



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**Proj:** 784

**EMSL Order:** 691701443  
**Customer ID:** 55CSCD42  
**Collected:** 7/13/2017  
**Received:** 7/17/2017  
**Analyzed:** 7/20/2017

## Test Report: Allergenco-D™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number: Client Sample ID: Volume (L): Sample Location:	691701443-0001 SP1 75 AMBIENT- CENTRE OF CAMPSITE			691701443-0002 SP2 75 TRAILER- MEETING AREA & SLEEPING			691701443-0003 SP3 75 KITCHEN & REC ROOM			
	Spore Types	Raw Count	Count/m <sup>3</sup>	% of Total	Raw Count	Count/m <sup>3</sup>	% of Total	Raw Count	Count/m <sup>3</sup>	% of Total
Alternaria	-	-	-	-	-	-	-	-	-	-
Ascospores	36	1600	13	23	1000	16.2	18	800	15.8	
Aspergillus/Penicillium	3	100	0.8	5	200	3.2	24	1100	21.7	
Basidiospores	230	10200	83	79	3500	56.8	68	3000	59.2	
Bipolaris++	-	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-	-
Cladosporium	7	300	2.4	31	1400	22.7	2	90	1.8	
Curvularia	-	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-	-
Ganoderma	1	40	0.3	-	-	-	-	-	-	-
Myxomycetes++	1	40	0.3	1	40	0.6	1	40	0.8	
Pithomyces	-	-	-	1*	10*	0.2	-	-	-	-
Rust	1*	10*	0.1	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	1*	10*	0.2	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	1	40	0.8	
Zygomycetes	-	-	-	-	-	-	-	-	-	-
Botrytis	-	-	-	-	-	-	-	-	-	-
<b>Total Fungi</b>	<b>279</b>	<b>12290</b>	<b>100</b>	<b>141</b>	<b>6160</b>	<b>100</b>	<b>114</b>	<b>5070</b>	<b>100</b>	
Hyphal Fragment	-	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	44	-	-	44	-	-	44	-	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-	-
Background (1-5)	-	1	-	-	2	-	-	1	-	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum  
Myxomycetes++ = Myxomycetes/Periconia/Smut

Nicole Yeo, Laboratory Manager  
or Other Approved Signatory

No discernable field blank was submitted with this group of samples.

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "" Denotes particles found at 300X. \*.\* denotes not detected. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Initial report from: 07/20/2017 10:52:16

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Unit #2  
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**EMSL Order:** 691701443  
**Customer ID:** 55CSCD42  
**Collected:** 7/13/2017  
**Received:** 7/17/2017  
**Analyzed:** 7/20/2017

**Proj:** 784

**Test Report: Allergenco-D™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)**

Lab Sample Number: Client Sample ID: Volume (L): Sample Location:	691701443-0004			691701443-0005			691701443-0006			
	Raw Count	Count/m <sup>3</sup>	% of Total	Raw Count	Count/m <sup>3</sup>	% of Total	Raw Count	Count/m <sup>3</sup>	% of Total	
SP4 75 CABIN #1				SP5 75 CABIN #2			SP6 75 CABIN #3			
<b>Spore Types</b>	<b>Raw Count</b>	<b>Count/m<sup>3</sup></b>	<b>% of Total</b>	<b>Raw Count</b>	<b>Count/m<sup>3</sup></b>	<b>% of Total</b>	<b>Raw Count</b>	<b>Count/m<sup>3</sup></b>	<b>% of Total</b>	
Alternaria	-	-	-	-	-	-	-	-	-	
Ascospores	16	710	14.4	13	580	13	20	890	19	
Aspergillus/Penicillium	4	200	4.1	5	200	4.5	4	200	4.3	
Basidiospores	71	3200	64.9	49	2200	49.3	71	3200	68.2	
Bipolaris++	-	-	-	-	-	-	-	-	-	
Chaetomium	-	-	-	-	-	-	-	-	-	
Cladosporium	11	490	9.9	23	1000	22.4	8	400	8.5	
Curvularia	-	-	-	-	-	-	-	-	-	
Epicoccum	-	-	-	-	-	-	-	-	-	
Fusarium	-	-	-	-	-	-	-	-	-	
Ganoderma	4	200	4.1	1	40	0.9	-	-	-	
Myxomycetes++	2	90	1.8	8	400	9	-	-	-	
Pithomyces	-	-	-	-	-	-	-	-	-	
Rust	-	-	-	1	40	0.9	-	-	-	
Scopulariopsis	-	-	-	-	-	-	-	-	-	
Stachybotrys	-	-	-	-	-	-	-	-	-	
Torula	-	-	-	-	-	-	-	-	-	
Ulocladium	-	-	-	-	-	-	-	-	-	
Unidentifiable Spores	-	-	-	-	-	-	-	-	-	
Zygomycetes	-	-	-	-	-	-	-	-	-	
Botrytis	1	40	0.8	-	-	-	-	-	-	
<b>Total Fungi</b>	<b>109</b>	<b>4930</b>	<b>100</b>	<b>100</b>	<b>4460</b>	<b>100</b>	<b>103</b>	<b>4690</b>	<b>100</b>	
Hyphal Fragment	-	-	-	-	-	-	-	-	-	
Insect Fragment	-	-	-	-	-	-	-	-	-	
Pollen	-	-	-	-	-	-	-	-	-	
Analyt. Sensitivity 600x	-	44	-	-	44	-	-	44	-	
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-	
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-	
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-	
Background (1-5)	-	2	-	-	2	-	-	1	-	

Bipolaris++ = Bipolaris/Drechslera/Exserohilum  
Myxomycetes++ = Myxomycetes/Periconia/Smut

Nicole Yeo, Laboratory Manager  
or Other Approved Signatory

No discernable field blank was submitted with this group of samples.

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "" Denotes particles found at 300X. \*.\* denotes not detected. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

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**Customer ID:** 55CSCD42  
**Collected:** 7/13/2017  
**Received:** 7/17/2017  
**Analyzed:** 7/20/2017

**Proj:** 784

**Test Report: Allergenco-D™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)**

Lab Sample Number:	691701443-0007			691701443-0008		
Client Sample ID:	SP7			SP8		
Volume (L):	75			75		
Sample Location:	SLEEPING QUARTERS 4A			SLEEPING QUARTERS 4B		
Spore Types	Raw Count	Count/m <sup>3</sup>	% of Total	Raw Count	Count/m <sup>3</sup>	% of Total
Alternaria	-	-	-	-	-	-
Ascospores	25	1100	16	11	490	17.3
Aspergillus/Penicillium	1	40	0.6	1	40	1.4
Basidiospores	111	4930	71.6	47	2100	74.2
Bipolaris++	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-
Cladosporium	17	760	11	4	200	7.1
Curvularia	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-
Ganoderma	1	40	0.6	-	-	-
Myxomycetes++	1*	10*	0.1	-	-	-
Pithomyces	-	-	-	-	-	-
Rust	1*	10*	0.1	-	-	-
Scopulariopsis	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-
Torula	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-
Botrytis	-	-	-	-	-	-
<b>Total Fungi</b>	<b>157</b>	<b>6890</b>	<b>100</b>	<b>63</b>	<b>2830</b>	<b>100</b>
Hyphal Fragment	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-
Pollen	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	44	-	-	44	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-
Background (1-5)	-	2	-	-	2	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum  
Myxomycetes++ = Myxomycetes/Periconia/Smut

Nicole Yeo, Laboratory Manager  
or Other Approved Signatory

No discernable field blank was submitted with this group of samples.

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "" Denotes particles found at 300X. \*.\* denotes not detected. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Initial report from: 07/20/2017 10:52:16

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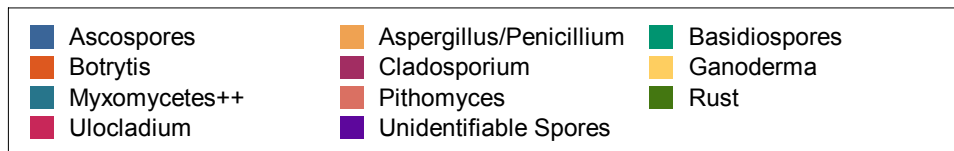
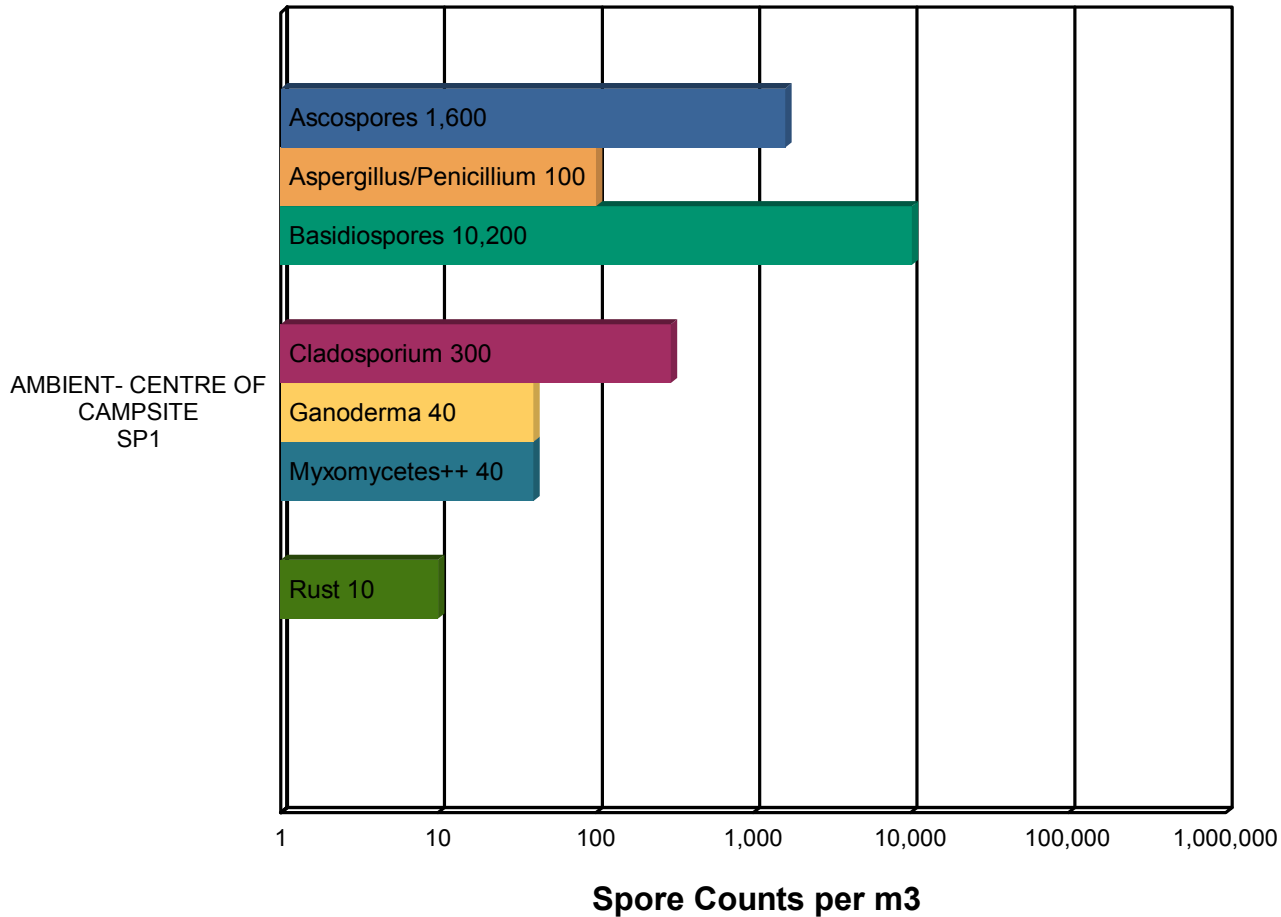
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Cascadia OHS  
1962 Quinn St. South  
Unit #2  
Prince George, BC V2N 1X5

**EMSL Order:** 691701443  
**Customer ID:** 55CSCD42  
**Collected:** 7/13/2017  
**Received:** 7/17/2017  
**Analyzed:** 7/20/2017

**Proj:** 784

## Spore Trap Report: Total Counts



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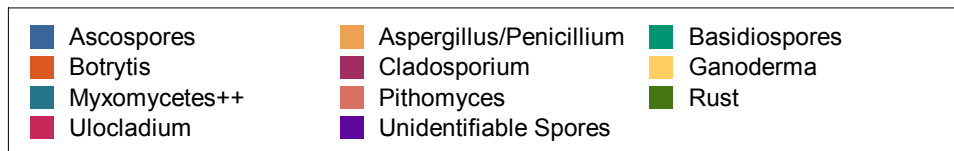
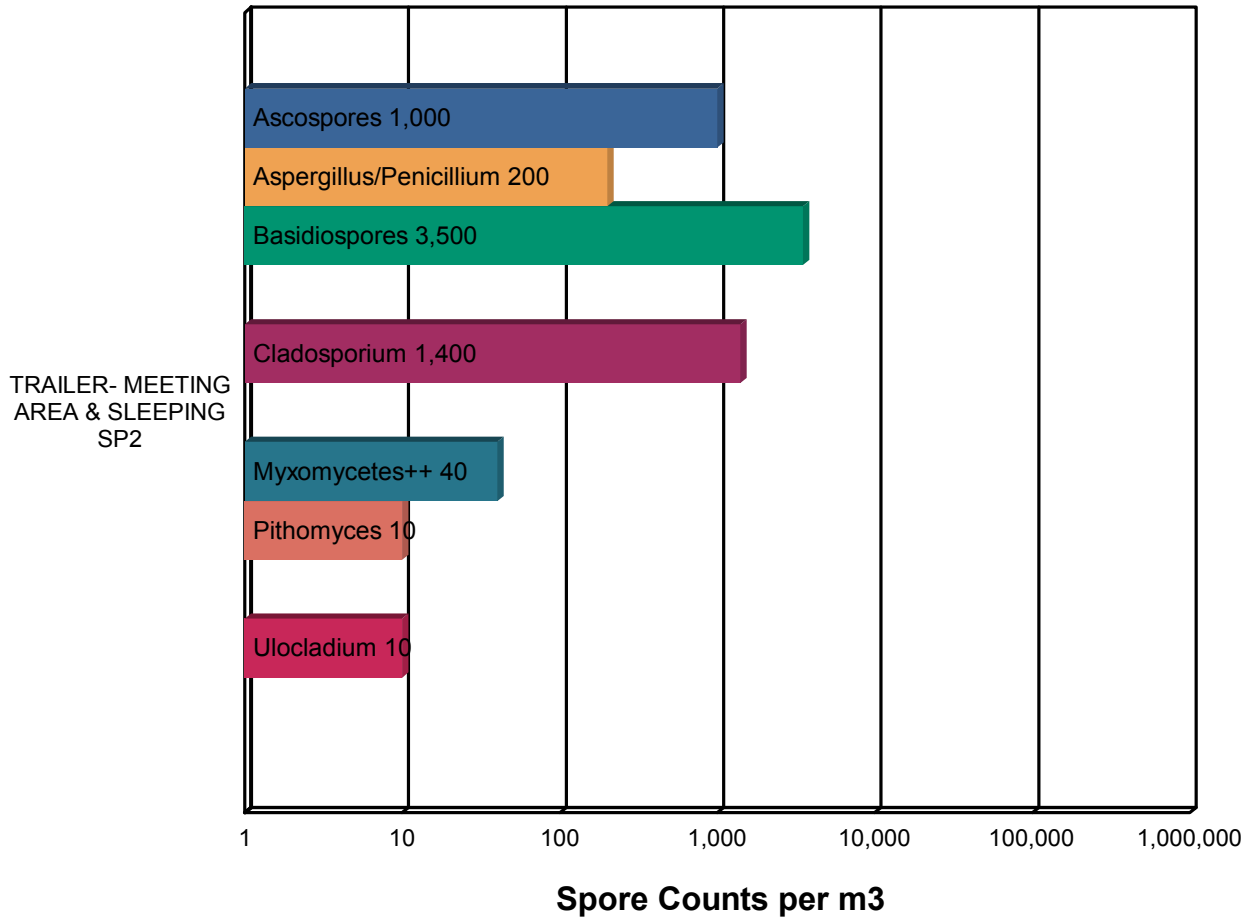
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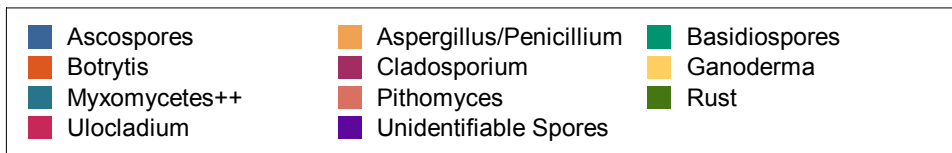
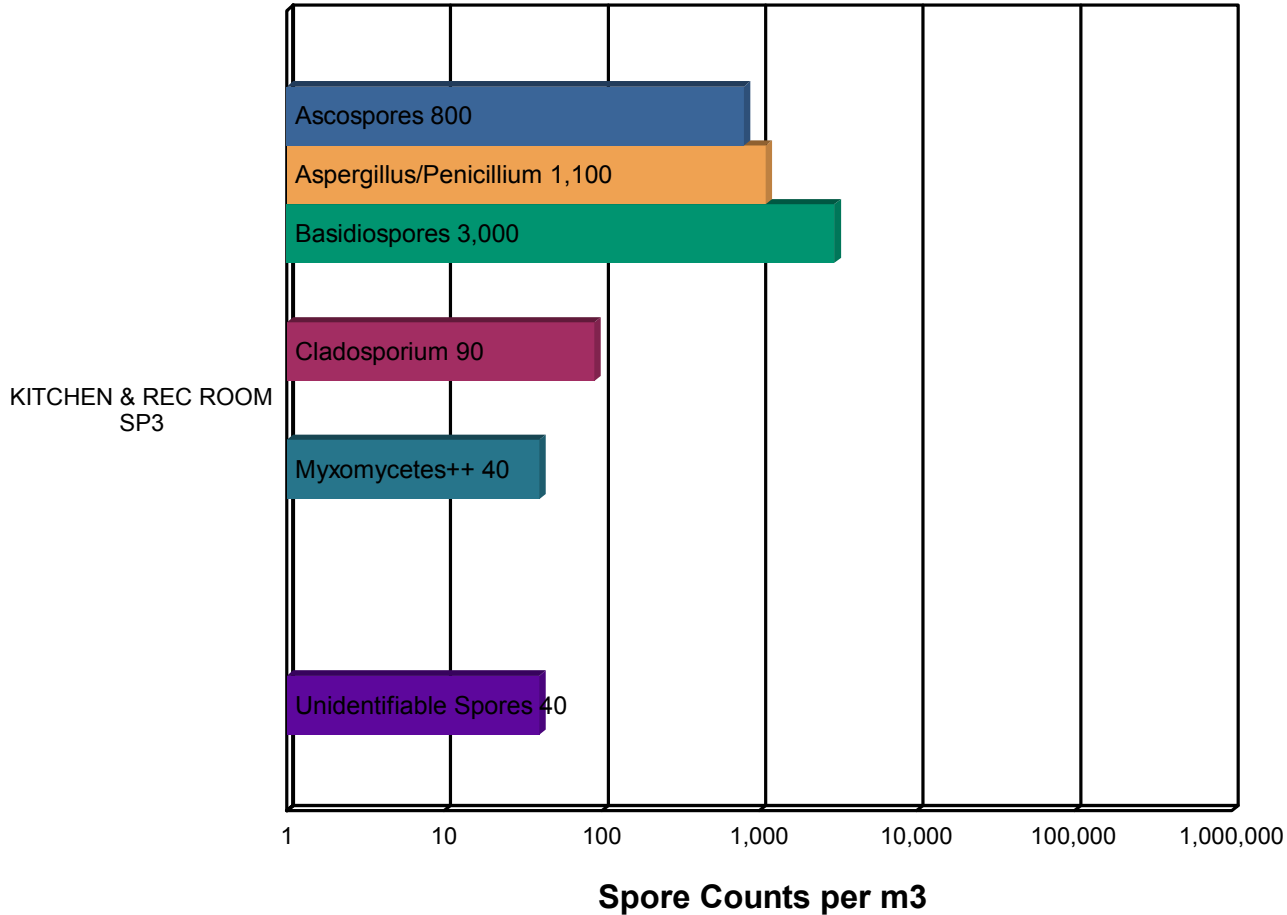
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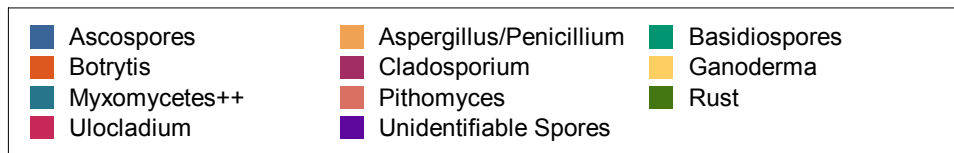
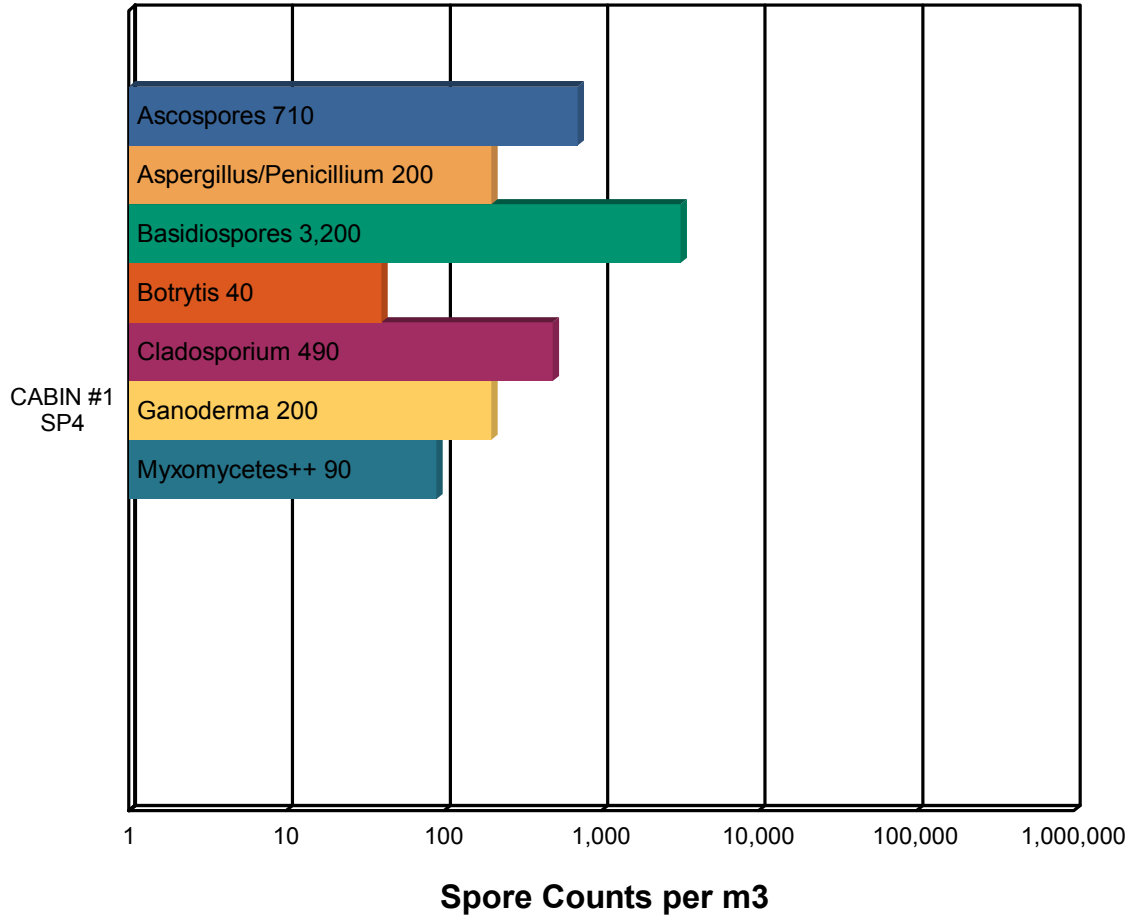
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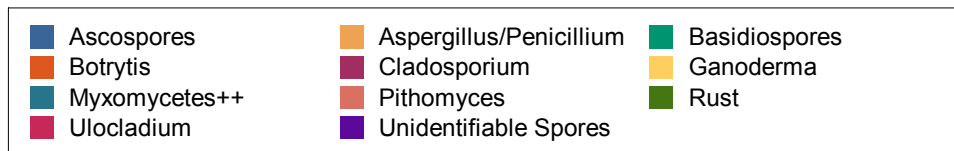
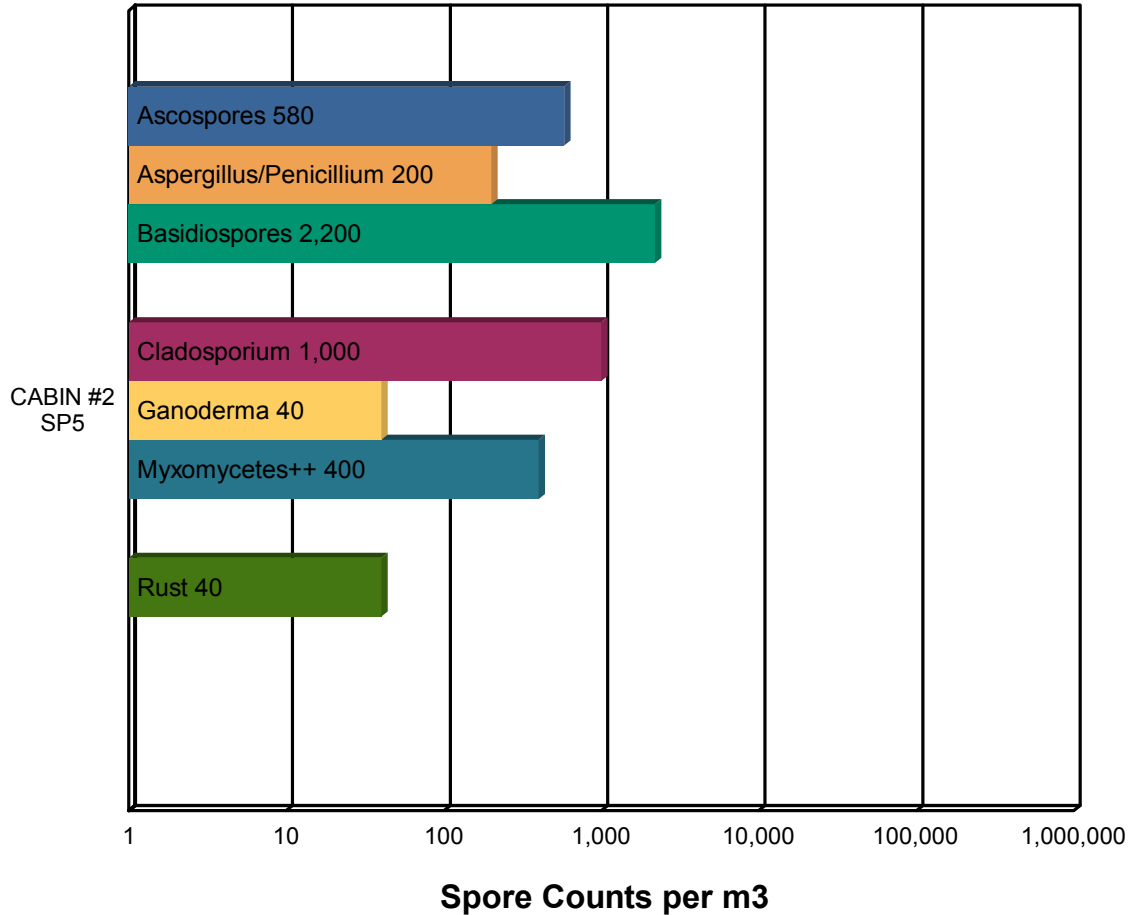
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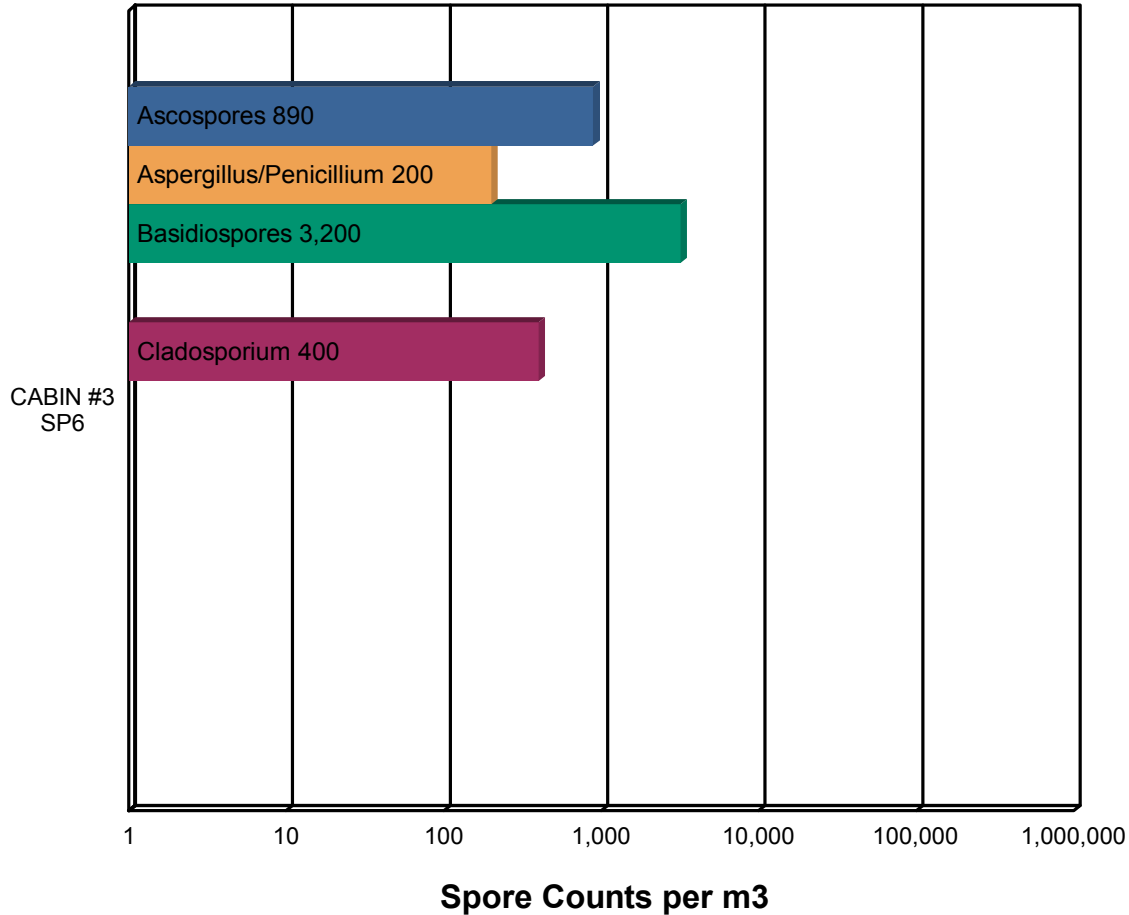
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Ascospores	Aspergillus/Penicillium	Basidiospores
Botrytis	Cladosporium	Ganoderma
Myxomycetes++	Pithomyces	Rust
Ulocladium	Unidentifiable Spores	

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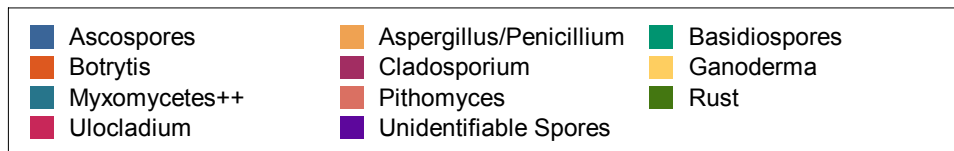
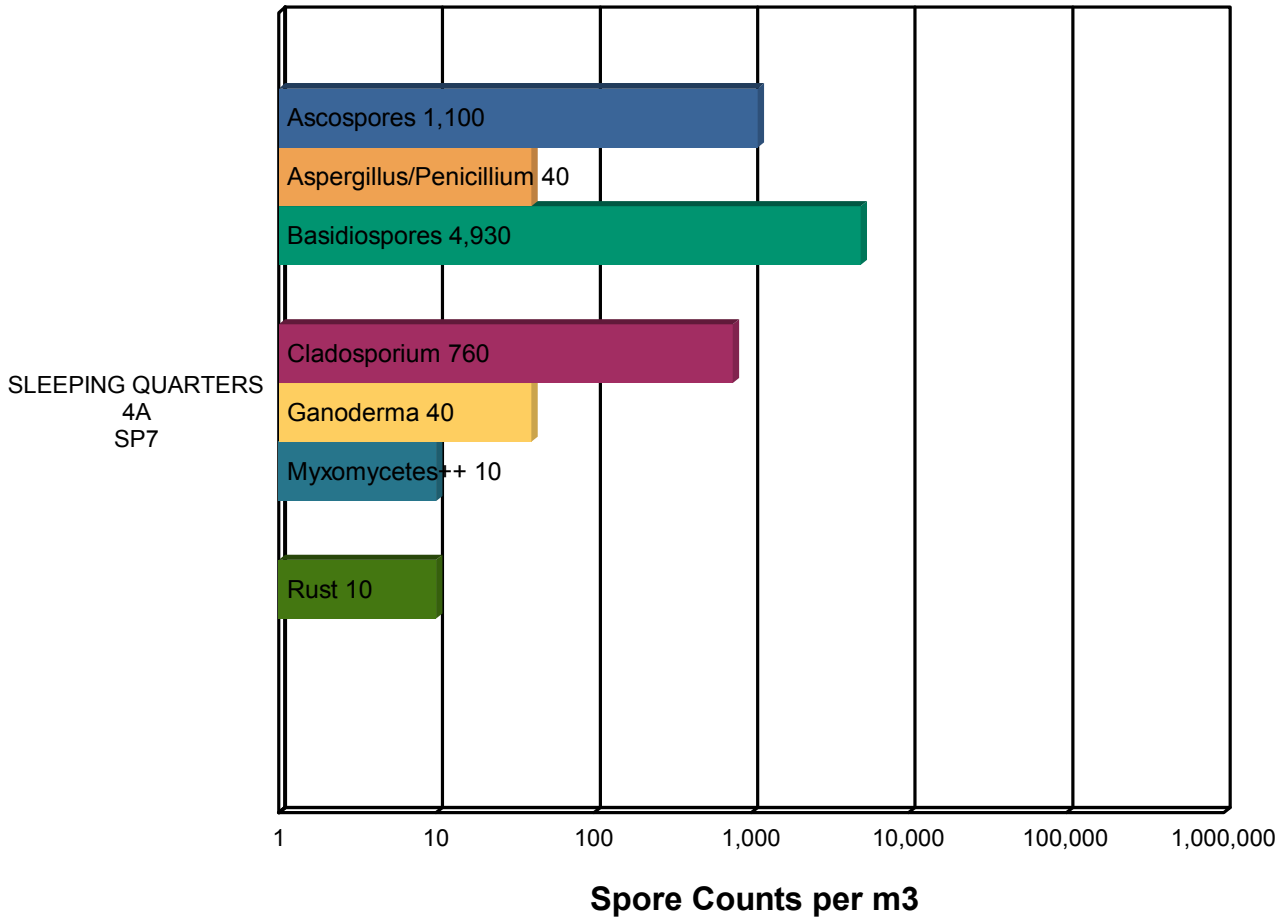
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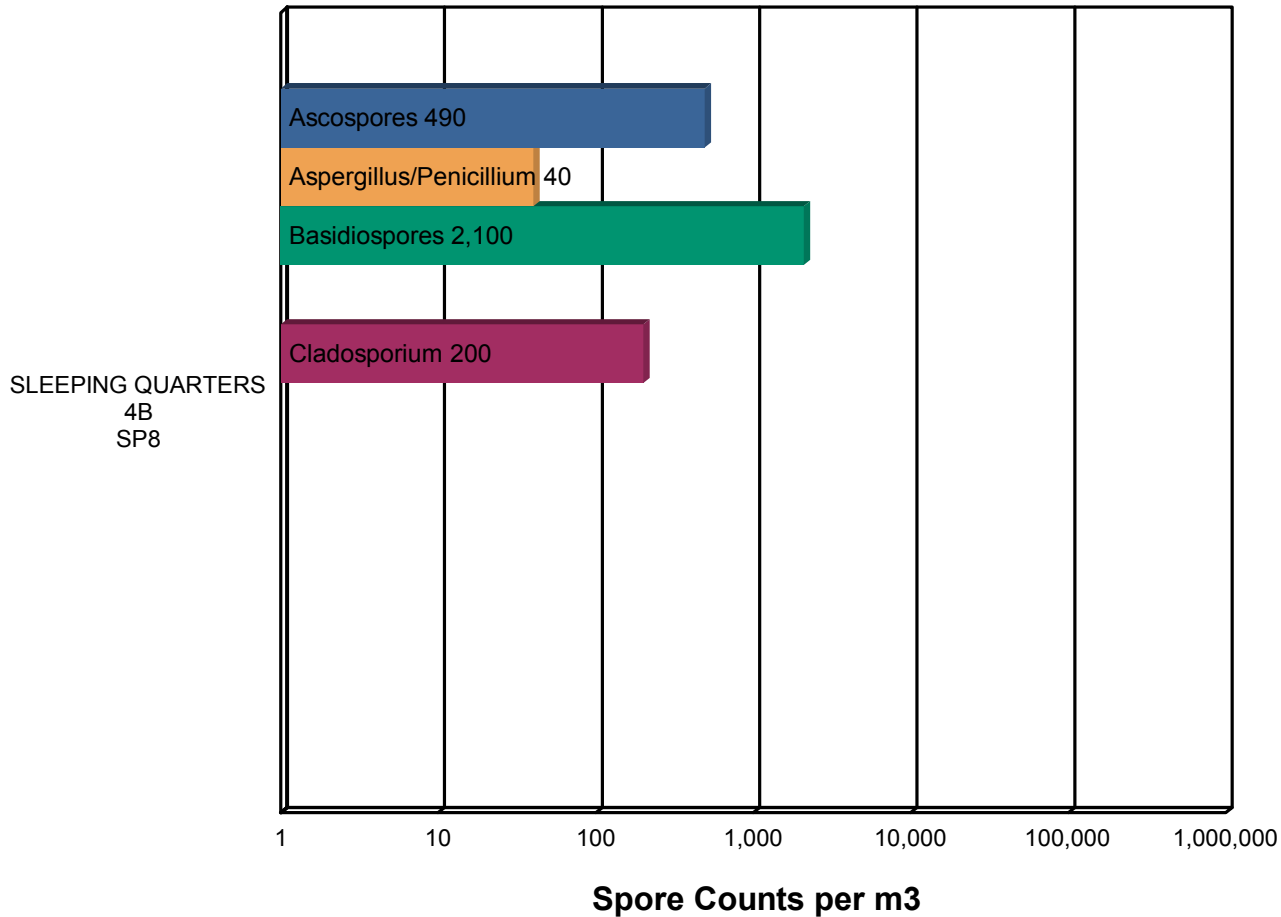
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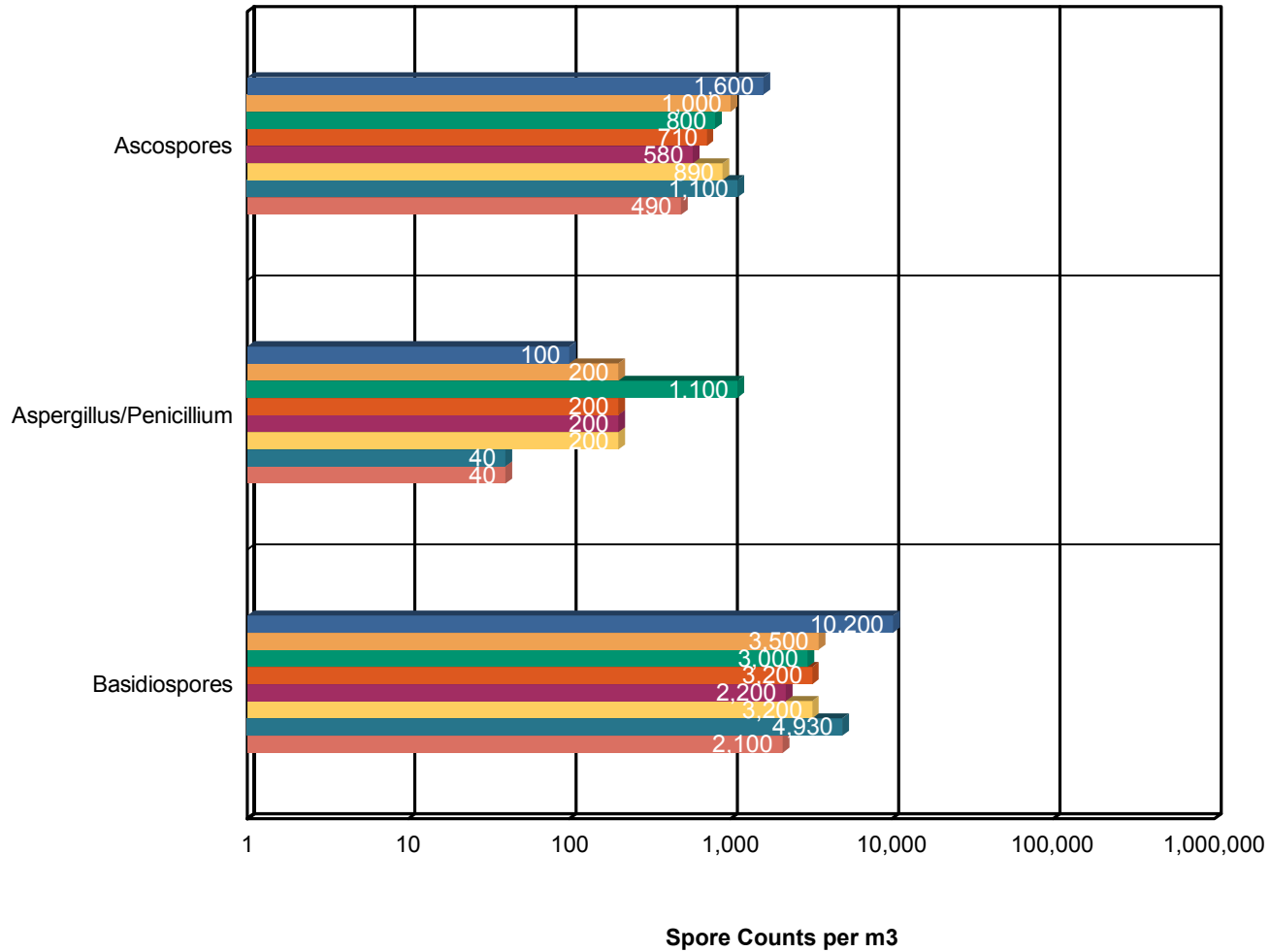
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## Background Comparison Chart



SP1 AMBIENT-CENTRE OF CAMPSITE	SP2 TRAILER-MEETING AREA & SLEEPING	SP3 KITCHEN & REC ROOM	SP4 CABIN #1
SP5 CABIN #2	SP6 CABIN #3	SP7 SLEEPING QUARTERS 4A	SP8 SLEEPING QUARTERS 4B

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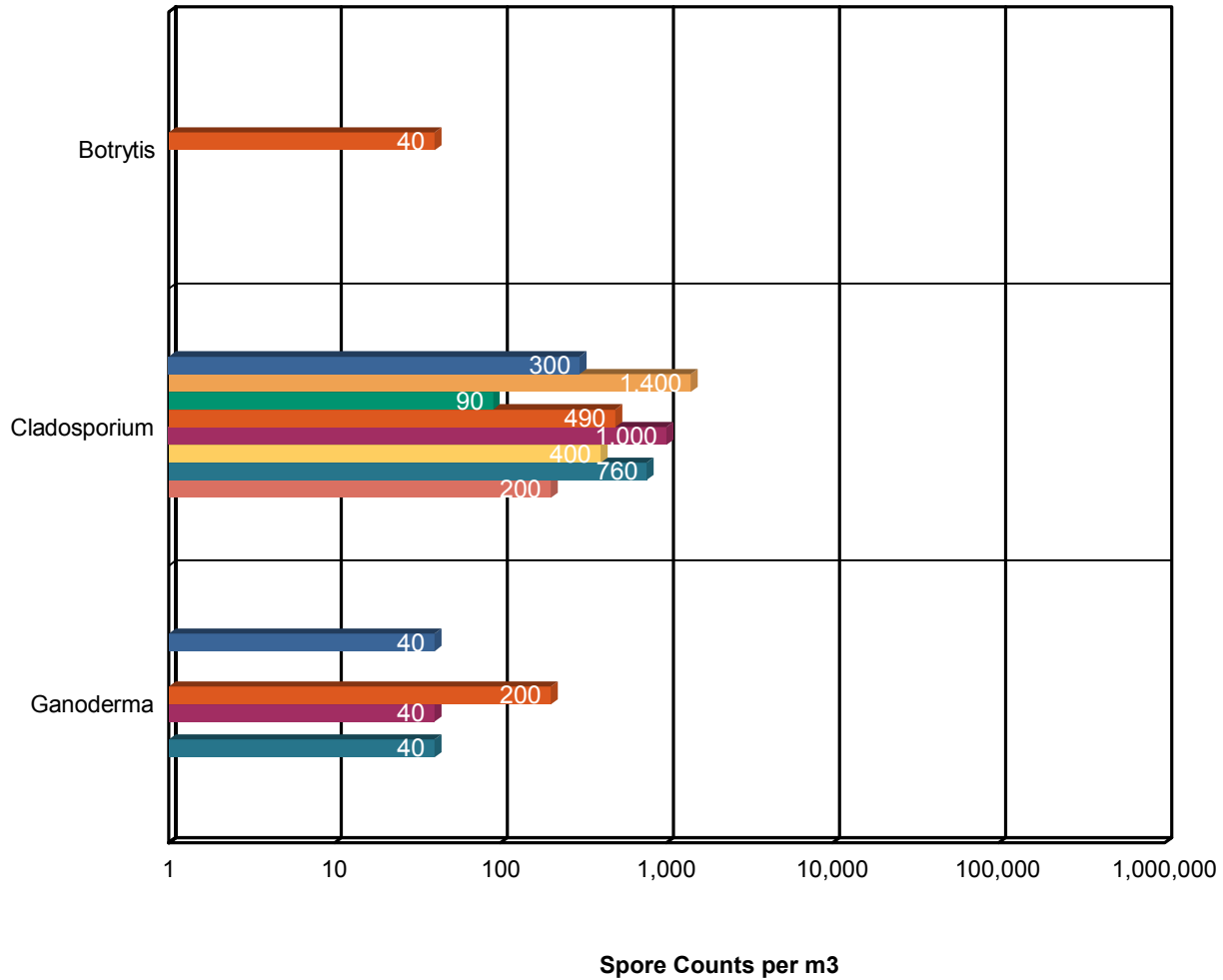
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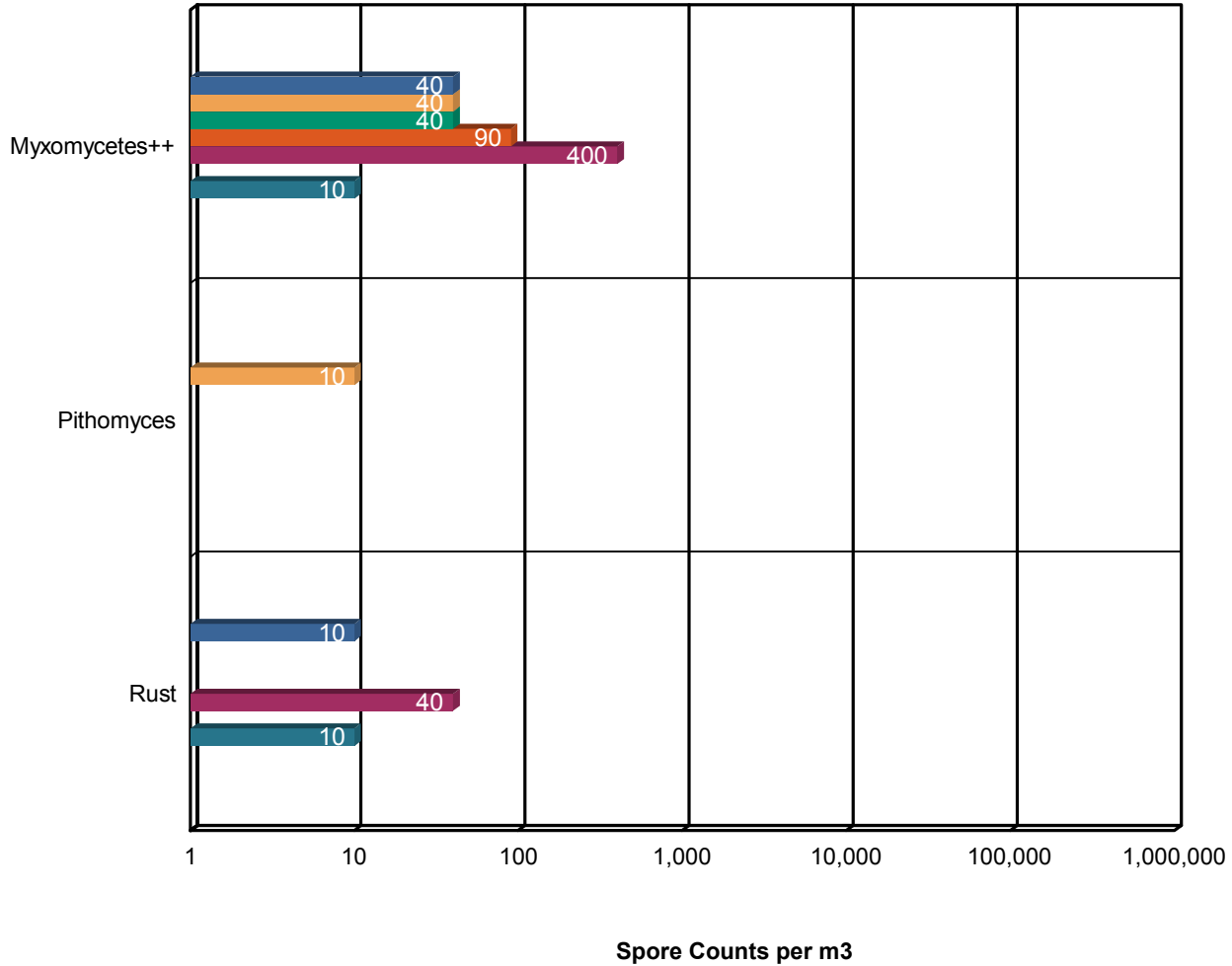
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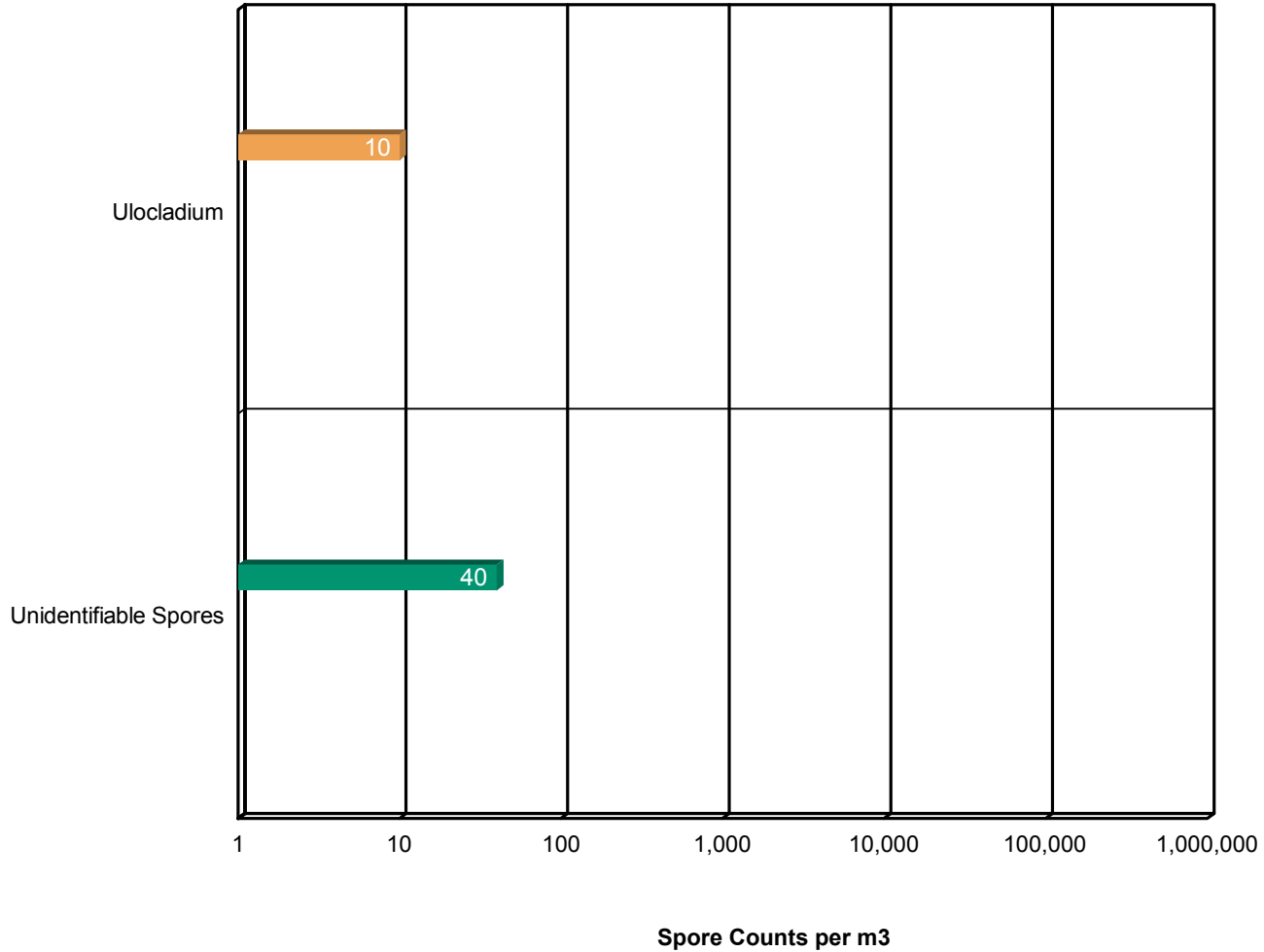
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### 3. Understanding the Results

EMSL Canada Inc. is an independent laboratory, providing unbiased and scientifically valid results. These data represent only a portion of an overall IAQ investigation. Visual information and environmental conditions measured during the site assessment (humidity, moisture readings, etc.) are crucial to any final interpretation of the results. Many factors impact the final results; therefore, result interpretation should only be conducted by qualified individuals. The American Conference of Governmental Industrial Hygienists (ACGIH) has published a good reference book covering sampling and data interpretation. It is entitled, Bioaerosols: Assessment and Control, 1999.

Fungal spores are found everywhere. Whether or not symptoms develop in people exposed to fungi depends on the nature of the fungal material (e.g., allergenic, toxic, or infectious), the exposure level, and the susceptibility of exposed persons. Susceptibility varies with the genetic predisposition (e.g., allergic reactions do not always occur in all individuals), age, pre-existing medical conditions (e.g., diabetes, cancer, or chronic lung conditions), use of immunosuppressive drugs, and concurrent exposures. These reasons make it difficult to identify dose/response relationships that are required to establish "safe" or "unsafe" levels (i.e., permissible exposure limits).

It is generally accepted in the industry that indoor fungal growth is undesirable and inappropriate, necessitating removal or other appropriate remedial actions. The New York City guidelines and EPA guidelines for mold remediation in schools and commercial buildings define the conditions warranting mold remediation. Always remember that water is the key. Preventing water damage or water condensation will prevent mold growth.

This report is not intended to provide medical advice or advice concerning the relative safety of an occupied space. Always consult an occupational or environmental health physician who has experience addressing indoor air contaminants if you have any questions.



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## 4. Glossary of Fungi

<b>ASCOSPORES</b>	
<b>Allergic Potential</b>	Depends on genus and species.
<b>Industrial Uses</b>	
<b>Mode of Dissemination</b>	Forcible ejection or passive release and dissemination by wind or insects.
<b>Natural Habitat</b>	Everywhere in nature.
<b>Other Comments</b>	Ascospores are the result of sexual reproduction and produced in a saclike structure called an ascus. All ascospores belong to members of the Phylum Ascomycota, which encompasses a plethora of genera worldwide.
<b>Potential or Opportunistic Pathogens</b>	Depends on genus and species.
<b>Potential Toxins Produced</b>	
<b>Suitable Substrates in the Indoor Environment</b>	
<b>Water Activity</b>	

<b>ASPERGILLUS/PENICILLIUM</b>	
<b>Allergic Potential</b>	Type I (hay fever, asthma) · Type III (hypersensitivity)
<b>Industrial Uses</b>	Many depending on the species
<b>Mode of Dissemination</b>	Wind · Insects
<b>Natural Habitat</b>	· Plant debris · Seed · Cereal crops
<b>Other Comments</b>	Spores of Aspergillus and Penicillium (including others such as Acremonium and Paecilomyces) are small and spherical with few distinguishing characteristics. They cannot be differentiated or speciated by non-viable impaction sampling methods. Some species with very small spores may be undercounted in samples with high background debris.
<b>Potential or Opportunistic Pathogens</b>	Possible depending on the species.
<b>Potential Toxins Produced</b>	
<b>Suitable Substrates in the Indoor Environment</b>	Grows on a wide range of substrates indoors · Prevalent in water damaged buildings · Foods (blue mold on cereals, fruits, vegetables, dried foods) · House dust · Fabrics · Leather · Wallpaper · Wallpaper glue
<b>Water Activity</b>	Aw=0.75-0.94

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<b>BASIDIOSPORES</b>	
Allergic Potential	Type I allergies (hay fever, asthma) . Type III (hypersensitivity pneumonitis)
Industrial Uses	Edible mushrooms are used in the food industry.
Mode of Dissemination	Forcible ejection. Wind currents.
Natural Habitat	Forest floors. Lawns .Plants (saprobes or pathogens depending on genus)
Other Comments	Basidiospores are the result of sexual reproduction and formed on a structure called the basidium. Basidiospores belong to the members of the Phylum Basidiomycota, which includes mushrooms, shelf fungi, rusts, and smuts.
Potential or Opportunistic Pathogens	Depends on genus.
Potential Toxins Produced	Amanitins. monomethyl-hydrazine. muscarine. ibotenic acid. psilocybin.
Suitable Substrates in the Indoor Environment	Depends on genus. Wood products
Water Activity	Unknown.

<b>BOTRYTIS</b>	
Allergic Potential	Type 1 (Hayfever and asthma); Type 2 (hypersensitivity pneumonitis)
Mode of Dissemination	Wind, rain
Natural Habitat	Plant pathogen responsible for causing gray mold (B. cinerea) on raspberries, blackberries, lettuce, cabbage.
Potential or Opportunistic Pathogens	Unknown
Suitable Substrates in the Indoor Environment	Houseplants, fruits, vegetables
Water Activity	Aw 0.93-0.95

<b>CLADOSPORIUM</b>	
Allergic Potential	Type I (asthma and hay fever).
Industrial Uses	Produces 10 antigens.
Mode of Dissemination	Air
Natural Habitat	Dead plant matter. Straw. Soil. Woody plants
Potential or Opportunistic Pathogens	Edema. keratitis. onychomycosis. pulmonary infections. Sinusitis.
Potential Toxins Produced	Cladosporin and Emodin.
Suitable Substrates in the Indoor Environment	Fiberglass duct liner. Paint. Textiles. Found in high concentration in water-damaged building materials.
Water Activity	Aw 0.84-0.88

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**Attn:** Glenn Wong  
Cascadia OHS  
1962 Quinn St. South  
Unit #2  
Prince George, BC V2N 1X5

**EMSL Order:** 691701443  
**Customer ID:** 55CSCD42  
**Collected:** 7/13/2017  
**Received:** 7/17/2017  
**Analyzed:** 7/20/2017

**Proj:** 784

<b>GANODERMA</b>	
<b>Allergic Potential</b>	Ganoderma species are known to cause allergies in people on a worldwide scale.
<b>Industrial Uses</b>	Biopulping of wood for the paper industry. Potential medicinal use due to: 1. Inhibition of Ras dependent cell transformation, 2. Antifibrotic activity, 3. Immunomodulating activity, 4. Free-radicle scavenging
<b>Mode of Dissemination</b>	Wind.
<b>Natural Habitat</b>	Grows on conifers and hardwoods worldwide, causing white rot, root rot, and stem rot.
<b>Other Comments</b>	Used in traditional Chinese medicine as an herbal supplement. It is also known as a "shelf fungus" because the fruiting body forms a stalk-less shelf on the sides of trees and logs. It is sometimes called "artists conk" because when you scratch the white pores of the fruiting body, the white rubs away and exposes the brown hyphae underneath. Thus, pictures can be produced on the fruiting body.
<b>Potential or Opportunistic Pathogens</b>	Unknown.
<b>Potential Toxins Produced</b>	
<b>Reference</b>	References: Craig, R.L., Levetin, E. 2000. Multi-year study of Ganoderma aerobiology. <i>Aerobiologia</i> 16: 75-81. <a href="http://www.pfc.forestry.ca/diseases/CTD/Group/Heart/heart6_e.html">http://www.pfc.forestry.ca/diseases/CTD/Group/Heart/heart6_e.html</a>
<b>Suitable Substrates in the Indoor Environment</b>	Unknown.
<b>Water Activity</b>	

<b>MYXOMYCETES++</b>	
<b>Allergic Potential</b>	Type I
<b>Free moisture required for mold growth</b>	Unknown
<b>Industrial Uses</b>	
<b>Mode of Dissemination</b>	Insects, Water, Wind
<b>Natural Habitat</b>	Decaying logs, Dead leaves , Dung , Lawns , Mulched flower beds, Lawns
<b>Potential or Opportunistic Pathogens</b>	Unknown
<b>Suitable Substrates in the Indoor Environment</b>	Rotting lumber

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<b>PITHOMYCES</b>	
<b>Allergic Potential</b>	Unknown
<b>Industrial Uses</b>	
<b>Mode of Dissemination</b>	Wind
<b>Natural Habitat</b>	A worldwide saprophytic fungi, being isolated from dead plant material and soil.
<b>Other Comments</b>	
<b>Potential or Opportunistic Pathogens</b>	Mycosis in immunocompromised patients
<b>Potential Toxins Produced</b>	
<b>Reference</b>	
<b>Suitable Substrates in the Indoor Environment</b>	Paper
<b>Water Activity</b>	Requires high moisture for spore germination

<b>RUSTS</b>	
<b>Allergic Potential</b>	Type I. (hay fever, asthma)
<b>Free moisture required for mold growth</b>	Unknown
<b>Mode of Dissemination</b>	Wind, Forcible Ejection
<b>Natural Habitat</b>	Parasitic on cultivated and many types of plants
<b>Potential or Opportunistic Pathogens</b>	Unknown
<b>Suitable Substrates in the Indoor Environment</b>	Unknown- rust fungi require a living plant host for growth

<b>ULOCLADIUM</b>	
<b>Allergic Potential</b>	Hay fever, asthma
<b>Mode of Dissemination</b>	Wind
<b>Natural Habitat</b>	A worldwide saprophytic fungi, being isolated from dead plant material and soil.
<b>Potential or Opportunistic Pathogens</b>	Unknown
<b>Suitable Substrates in the Indoor Environment</b>	Wallboard, jute, paper, wood, textiles. Good indicator of water damage.
<b>Water Activity</b>	0.89

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### 5. References and Informational Links

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### Books

- Bioaerosols: Assessment and Control. Janet Macher, Ed., American Conference of Governmental Industrial Hygienists, Cincinnati, OH 1999.
- Exposure Guidelines for Residential Indoor Air Quality. Environmental Health Directorate, Health Protection Branch, Health Canada, Ottawa, Ontario, 1989.
- Fungal Contamination in Public Buildings: Health Effects and Investigation Methods. Health Canada, Ottawa, Ontario, 2004.
- IICRC: S500 Standard and Reference Guide for Professional Water Damage Restoration. 3rd Edition, Institute of Inspection, Cleaning, and Restoration Certification, Vancouver, WA, 2006

IICRC: S520 Standard and Reference Guide for Professional Mold Remediation. 1st Edition, Institute of Inspection, Cleaning, and Restoration Certification, Vancouver, WA, 2004

- Field Guide for the Determination of Biological Contaminants in Environmental Samples. 2nd Edition, American Industrial Hygiene Association, 2005.

### Consumer Links

Read the full text of AIHA's "The Facts About Mold" consumer brochure.

<http://www.aiha.org/get-involved/VolunteerGroups/Documents/Biosafety/VG-FactsAbout%20MoldDecember2011.pdf>

The Occupational Safety and Health Administration (OSHA)

<http://www.osha.gov/SLTC/molds/index.html>

CDC Mold Facts

<http://www.cdc.gov/mold/faqs.htm>

CDC Stachybotrys - Questions and answers on Stachybotrys chartarum and other molds

<http://www.cdc.gov/mold/stachy.htm>

IOM, NAS: Clearing the Air: Asthma and Indoor Air Exposures

<http://www.iom.edu/Reports/2000/Clearing-the-Air-Asthma-and-Indoor-Air-Exposures.aspx>

National Library of Medicine-Mold website

<http://www.nlm.nih.gov/medlineplus/molds.html>

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California Department of Health Services (CADOHS)

<http://www.cal-iaq.org/separator/mold-and-dampness/about-mold>

Minnesota Department of Health

<http://www.health.state.mn.us/divs/eh/indoorair/mold/index.html>

New York City Department of Health and Mental Hygiene

<http://conyers.house.gov/index.cfm/issues?p=toxic-mold>

H.R.: The United States Toxic Mold Safety and Protection Act

<http://conyers.house.gov/index.cfm/issues?p=toxic-mold>

### EPA

"Should You Have the Air Ducts in Your Home Cleaned?"

<http://www.epa.gov/iaq/pubs/airduct.html>

General information about molds and actions that can be taken to clean up or prevent a mold problem.

<http://www.epa.gov/asthma/molds.html>

"A Brief Guide to Mold, Moisture, and Your Home" - Includes basic information on mold, cleanup guidelines, and moisture and mold prevention

<http://www.epa.gov/mold/moldguide.html>

"Mold Remediation in Schools and Commercial Buildings" - Information on remediation in schools and commercial property, references for potential mold and moisture remediators.

[http://www.epa.gov/mold/mold\\_remediation.html](http://www.epa.gov/mold/mold_remediation.html)

### FEMA

"Homes That Were Flooded May Harbor Mold Problems" - Information and tips for cleaning mold.

<http://www.fema.gov/news-release/homes-were-flooded-may-harbor-mold-problems>

"Dealing With Mold & Mildew in Your Flood Damaged Home.

[http://www.fema.gov/pdf/rebuild/recover/fema\\_mold\\_brochure\\_english.pdf](http://www.fema.gov/pdf/rebuild/recover/fema_mold_brochure_english.pdf)

"Prompt Flood Cleanup Can Help Prevent Health Problems" - How to clean up in-house mold problems (not large or serious exposures).

<http://www.fema.gov/news-release/prompt-flood-cleanup-can-help-prevent-health-problems>

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### 6. Important Terms, Conditions, and Limitations

#### A. Sample Retention

Samples analyzed by EMSL Canada will be retained for 60 days after analysis date. Storage beyond this period is available for a fee with written request prior to the initial 30 day period. Samples containing hazardous/toxic substances which require special handling will be returned to the client immediately. EMSL Canada reserves the right to charge a sample disposal fee or return samples to the client.

#### B. Change Orders and Cancellation

All changes in the scope of work or turnaround time requested by the client after sample acceptance must be made in writing and confirmed in writing by EMSL Canada. If requested changes result in a change in cost the client must accept payment responsibility. In the event work is cancelled by a client, EMSL Canada will complete work in progress and invoice for work completed to the point of cancellation notice. EMSL Canada is not responsible for holding times that are exceeded due to such changes.

#### C. Warranty

EMSL Canada warrants to its clients that all services provided hereunder shall be performed in accordance with established and recognized analytical testing procedures and with reasonable care in accordance with applicable federal, state and local laws. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. EMSL Canada disclaims any other warranties, express or implied, including a warranty of fitness for particular purpose and warranty of merchantability.

#### D. Limits of Liability

In no event shall EMSL Canada be liable for indirect, special, consequential, or incidental damages, including, but not limited to, damages for loss of profit or goodwill regardless of the negligence (either sole or concurrent) of EMSL Canada and whether EMSL Canada has been informed of the possibility of such damages, arising out of or in connection with EMSL Canada's services thereunder or the delivery, use, reliance upon or interpretation of test results by client or any third party. We accept no legal responsibility for the purposes for which the client uses the test results. EMSL Canada will not be held responsible for the improper selection of sampling devices even if we supply the device to the user. The user of the sampling device has the sole responsibility to select the proper sampler and sampling conditions to insure that a valid sample is taken for analysis. Any resampling performed will be at the sole discretion of EMSL Canada, the cost of which shall be limited to the

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reasonable value of the original sample delivery group (SDG) samples. In no event shall EMSL Canada be liable to a client or any third party, whether based upon theories of tort, contract or any other legal or equitable theory, in excess of the amount paid to EMSL Canada by client thereunder.

### E. Indemnification

Client shall indemnify EMSL Canada and its officers, directors and employees and hold each of them harmless for any liability, expense or cost, including reasonable attorney's fees, incurred by reason of any third party claim in connection with EMSL Canada services, the test result data or its use by client