



# *West Coast District Health Board*

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## *Te Poari Hauora a Rohe o Tai Poutini*

Corporate Office  
High Street, Greymouth 7840

Telephone 03 769-7400  
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6 June 2018

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[REDACTED]  
[REDACTED]

[REDACTED]

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### **RE Official Information Act request WCDHB 9114**

We refer to your email dated 10 April 2018 requesting the following information under the Official Information Act from West Coast DHB.

- 1. The summary or executive summary or conclusions section, and the recommendations section if any, of ANY report or advisory done for or received by the DHB or consultant to the DHB since 2011, into the weather-tightness of any of its current assets or assets demolished since 2004.**
- in the absence of such a summary, then the full report itself as above**

West Coast DHB recently became aware of a water ingress/humidity issue affecting parts of Greymouth Hospital. Mould was evident and samples from the following areas were sent for testing:

- IT Software office:
- Staff member's office; and
- Hardware office.

Please find attached as **Appendix 1** a Mould Remediation Plan from TechClean & Restoration received on 10 May 2018. The black mould in the staff member's office has since been removed in accordance with the remediation plan. Air samples are currently being analysed and next steps will depend on the air sampling results.

West Coast DHB has also recently had mould samples tested from parts of Haast Clinic, Haast. We attach as **Appendix 2** the report from Chemsafety dated 15 May 2018. The report indicates there is no "black mould" present in the building, however the six samples from waiting rooms, store room and toilet returned positive results for other types of mould. While there is no immediate health risk from toxic black mould, the other moulds are allergenic and may cause a reaction in sensitive people.

We are not otherwise aware of any issues in design or construction that that would render any DHB building a "leaky building". West Coast DHB does, however, have a number of old buildings that have issues in the nature of maintenance. These issues can be exacerbated by climatic conditions on the West Coast that can lead to greater humidity within buildings. Water ingress and any resulting mould issues are addressed as part of a business as usual maintenance programme.

I trust that this satisfies your interest in this matter.

Please note that this response, or an edited version of this response, may be published on the West Coast DHB website.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Gullery', with a long, sweeping horizontal line extending to the right.

Carolyn Gullery  
**Executive Director**  
**Planning, Funding & Decision Support**



## Mould remediation control plan for

<i>This document supersedes all previous issued management and removal plans for this workplace</i>			
<b>Site Address</b>	Greymouth Hospital		
<b>Client Name</b>	Canterbury District Health Board Evgeny Zakharov – Programme Manager – Health and Safety 021548356		
<b>Site Contact Person</b>	Evgeny		
<b>Site Contact E-Mail</b>	Evgeny.zakharov@cdhb.health.nz		
<b>Commissioned</b>	Dale Austen	<b>Tech Clean Staff Trained in Mould Remediation?</b>	Yes
<b>Authors</b>	Dale Austen	<b>Tech Clean staff receive training in PPE/RPE Use?</b>	Yes
<b>Revision</b>	Dale Austen	<b>Tech Clean staff received information regarding health risks with mould remediation and receive health monitoring?</b>	Yes
<b>Endorsed</b>	Dale Austen		

### Background

Tape samples collected from Greymouth Hospital staff and send to Chemsafety for mould analysis:

Sample Details	Microscopic Features
3 May 2018 #35846/1  <u>Sample type &amp; location</u> Adhesive tape sample  Pipes in IT software office  <u>Appearance</u> Black discolouration on tape	<b><i>Stachybotrys</i> was NOT detected.</b>  High level of <i>Cladosporium</i> and a moderate level of <i>Penicillium/Aspergillus</i> type spores present  <u>Conclusion</u> The mould is likely superficial growth in response to a raised relative humidity
3 May 2018 #35846/2  <u>Sample type &amp; location</u> Adhesive tape sample  Line managers office – carpet backing  <u>Appearance</u> Black discolouration was noted on the tape	<b><i>Stachybotrys</i> WAS detected</b> in moderate to abundant levels. Active growth likely.  Occasional <i>Chaetomium</i> and <i>Alternation</i> spores also present.  <u>Conclusion</u> Likely well established growth of <i>Stachybotrys</i>
4 September 2017 #35846/3  <u>Sample type &amp; location</u> Adhesive tape sample  Hardware office – concrete and rubber compound  <u>Appearance</u> Large black particulates adhering to tape	<b><i>Stachybotrys</i> was NOT detected.</b>  High levels of amorphous particulates with no obvious microbial elements observed  <u>Conclusion</u> No evidence of active fungal growth

## Proposed Remediation Personnel

Certified Supervisor (s)	Dale Austen – IICRC Applied Microbial 169696
Mould Remediation Crew	Edwin Pope, Steve Broughton
Specialist Operations	Dale Austen
Auditing / QA / Health and Safety	Tom Jeffrey
Overall Site Controller	Tech Clean Ltd
Spore Trap Sampling Analysis	Air samples to be sent to Biodet Services for analysis

## Proposed Removal dates

The contractor proposes to commence remediating the mould decontamination 9<sup>th</sup> / 10<sup>th</sup> May 2018

## Isolation of work area

All work areas to be isolated by signage as per the **Health and Safety in Employment Regulations 2015**

In addition to this barrier tape will be deployed to cordon off a work area.

No non mould remediation personal will be allowed to cross the barrier.

Upon entry to site any non-mould remediation personal will be appraised of the work being done and the isolation in place

## Remediation Sequence

Arrive on site, carry out toolbox and safety talk meetings. Set up barriers, signage, containment and decontamination chambers

Removal works involves labour only. Remediation will be done by lining out work faces separating this from the rest of no contaminated areas. Linings will be done with 250micron polythene sheeting. A negative air unit will be set up in S09 IT office extracting air to the exterior using certified units. **Once rooms/work areas isolated then remediation will happen as indicated below. No persons will be allowed access to this area without induction training and suitable PPE.**

## Plant and Equipment Proposed

### *Plant and Equipment*

- Electric leads tested and tagged current
- Negative air units with certified HEPA filters.
- HEPA vacuums
- Cardboard Boxes
- Polythene sheeting
- Danger / hazard signage / labels for packaging
- Decontamination chambers
- Carpet and upholstery cleaning equipment
- Anti microbial solution
- Step ladders
- Air compressors
- Generators
- Other products as required for dust suppression

### *Personal Protective Equipment*

- P3 half or full face HEPA respiratory protective devices (RPD's)
- Disposable full body coveralls (3 suits per day per staff)
- Construction Hard Hats
- Steel capped work boots or gumboots
- Hearing Protection
- Eye Protection/googles
- Disposable gloves
- Disposable booties
- Certified Ladders/scaffold

## Emergency evacuation

1. Emergency meeting point – front carpark
2. When all clear proceed back to decontamination unit and decontaminate

## Method for Removal –

**1<sup>st</sup> Step – set up containment**

**2<sup>nd</sup> Step – Removal of affected wall linings, flooring**

**3<sup>rd</sup> Step – HEPA vacuum and clean all surfaces and cavities**

**4<sup>th</sup> Step – Swirl up remaining spores by using pressured air**

**5<sup>th</sup> Step – HEPA vacuum and clean all surfaces and cavities**

**6<sup>th</sup> Step – Anti microbial wash down of all surfaces and cavities**

- 1 Site induction/safety meeting
- 2 Set up barriers, containment, signage
3. During the remediation process, all persons shall wear P3 HEPA filter RPD's and disposable coveralls during mould remediation in accordance with procedures as documented below.
4. A decontamination room will be set up adjacent work area using a disposable speed dock decontamination unit. This area will be set up to receive bagged and sealed from isolated rooms. This area will also be where the staff will remove overalls
5. The work area will have a cover of approved 250micron plastic over floor and additional lower micron clear polythene plastic covering all walls and doors to prevent any airborne mould spores from travelling.
6. Mould remediation as per the steps above
7. Removal of polythene, removal of all equipment, containments, rubbish sealed for disposal off site at a registered landfill.
8. Vacuuming using a certified HEPA vacuum cleaners will be used and everything washed down with anti microbial solution. The negative air units will be utilised continuously throughout the remediation. The primary filters will be checked, cleaned or changed daily.

## Decontamination Procedures

All personnel, plant and equipment utilised in the remediation of mould must be effectively cleaned to ensure that all spores are removed and no possibility of cross contamination into clean areas occurs.

The contractor proposes dry decontamination procedures for all personnel, with personnel wet wiping and if necessary vacuuming their coveralls, gloves, helmets and RPDS with a HEPA vacuum prior to removing all protective clothing and equipment and disposing of them in a 200µ plastic bag. All disposable clothing is to be marked and bagged as contaminated waste. Breathing apparatus are to be wiped with clean iso wipes before exiting the decontamination room. Iso wipes are to be disposed of as contaminated waste.

For all plant and equipment, these will be washed/wiped down prior to removing off site.



## Airborne Mould Spore Suppression

The negative air units will be utilised during and after the remediation process.

Other dust suppression agents may be used as required.

## Contingency Plan for the Discovery of Additional Mould

In the event that further contaminated materials be discovered during the removal operations (i.e. such as other unknown areas etc.), the following procedures will be implemented:

1. Site management will conduct a visual inspection of the materials, recording the following aspects;
  - Location of materials – clearly mark on available site plans where possible
  - Type of material
  - Condition of material – damage etc.
  - Potential Risk – possible mechanical damage from operations, water damage etc., and exposure levels to personnel etc.
2. Arrange with the Client or their representative for appropriate sampling of the material will be taken and recorded that is representative of the perceived extent of materials.
3. This information will be conveyed to contract management immediately.
4. A preliminary assessment of the exposure risk to personnel based on information will be done to determine the most appropriate course of temporary actions / controls to E/I/M/P the hazard to personnel until testing results are available.
5. If results are positive for the presence of mould, contract management will develop a method and if necessary particular safety plans for the safe and effective removal of the materials identified.
6. Contract management or the Client authorises necessary actions based on information provided.

## Proposed Landfill

The contractor proposes to use a transpacific offsite bin for disposal. This company holds the necessary consents and permits to accept such material.

## Background / Air Monitoring/ Spore Trapping

Tech clean will use an Bioaerosol Sampling pump and gather air samples from 4x locations:

S09, S15, S10 and outdoor sample for control comparison.

All samples will be sent to Biodet Services Auckland for analysis.

## Initial Findings

### S09 IT Office



Stachybotrys Detected

- Removal of contaminated flooring and wall lining
- HEPA vacuum and sanitize full room of contents/structure

### S15 Technicians Workshop



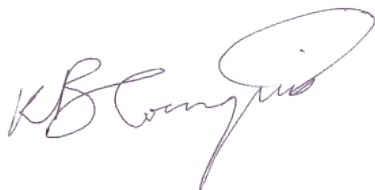
Cladosporium Detected

- Removal of contaminated flooring and wall lining
- HEPA vacuum and sanitize full room of contents/structure

## Mould ID Report Haast Clinic

### West Coast District Health Board

Prepared by



Reviewed by



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Report Date    **15 May 2018**

Reference        **66108**  
Report 1 version 1

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## Introduction

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Chemsafety was requested by the West Coast District Health Board, WCDHB to provide analysis of suspected mould samples taken from the Haast Clinic, Haast. The samples were collected by the WCDHB and were sent away by Chemsafety for analysis as received.

## Report Limitations

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This report has been prepared based on analytical techniques described reported in Table 1. The site conditions as described in this report have been interpreted from, and are subject to, this information and its limitations and accordingly Chemsafety does not represent that its interpretation accurately represents the full site conditions.

This report is intended to provide a general understanding of the types of mould and its location in the rooms assessed in order to assist with further information gathering and the beginnings of a remediation strategy. This report does not include exhaustive safety procedures for staff carrying out remediation works. Procedures should be in place prior to this work.

The information contained in this report applies to the time at which the inspections were carried out. With time, the site conditions could change, so that the reported assessment may be no longer valid. Thus, in the future, the report should not be used without confirming the validity of the reports information at that time.

All work is undertaken subject to our General Terms and Conditions of Trade. The report has been prepared by Chemsafety for the purpose described in the report. Chemsafety accepts no liability to any other person if the report is used for any other purpose. Any such use or reliance will be solely at their own risk. The presence or absence of other chemicals or hazards at the site is not considered in this report.

## Analysis Results

**Table 1 – Mould Analysis Results – Haast Clinic**

Sample Details	Microscopic Features
4 May 2018 #35882/1	<i>Stachybotrys</i> <b>was NOT detected.</b>
<u>Sample type &amp; location</u> Adhesive tape sample	High level of <i>Cladosporium</i> spores present.
4A. Corner waiting room, near skirting board	<u>Conclusion</u> The mould is likely superficial growth in response to a raised relative humidity.
<u>Appearance</u> Grey/Black discolouration on tape	
4 May 2018 #35882/2	<i>Stachybotrys</i> <b>was NOT detected.</b>
<u>Sample type &amp; location</u> Adhesive tape sample	Discrete areas of high-level <i>Cladosporium</i> like growth.
4B. Corner waiting room wall	<u>Conclusion</u> The mould is likely superficial growth in response to a raised relative humidity.
<u>Appearance</u> Black spotted discolouration was noted on the tape.	
4 May 2018 #35882/3	<i>Stachybotrys</i> <b>was NOT detected.</b>
<u>Sample type &amp; location</u> Adhesive tape sample	Discrete areas of moderate-level <i>Cladosporium</i> like growth and another un-identified fungus.
5. Storeroom, lower north wall	<u>Conclusion</u> The mould is likely superficial growth in response to a raised relative humidity.
<u>Appearance</u> Large black particulates adhering to tape.	
4 May 2018 #35882/4	<i>Stachybotrys</i> <b>was NOT detected.</b>
<u>Sample type &amp; location</u> Adhesive tape sample	An occasional area of high level <i>Wallemia</i> . Occasional <i>Penicillium/Aspergillus</i> spores, <i>Cladosporium</i> and miscellaneous spores.
1. Under cushions on bench seat in waiting room	<u>Conclusion</u> The mould is likely superficial growth in response to a raised relative humidity.
<u>Appearance</u> Particulates adhering to tape.	

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4 May 2018 #35882/5	<i>Stachybotrys</i> <b>was NOT detected.</b>
<u>Sample type &amp; location</u> Adhesive tape sample	Dense particulate's with an unidentified dematiaceous fungus actively growing within the particles.
2.Staff and Patient toilet	<u>Conclusion</u>
<u>Appearance</u> Faint greyish discolouration on tape.	Likely active growth in response to a damp environment.

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4 May 2018 #35882/6	<i>Stachybotrys</i> <b>was NOT detected.</b>
<u>Sample type &amp; location</u> Adhesive tape sample	Discrete areas of moderate-level <i>Cladosporium</i> like growth and another un-identified fungus.
3. Store room , north wall	<u>Conclusion</u>
<u>Appearance</u> Greyish discolouration noted on tape.	The mould is likely superficial growth in response to a raised relative humidity.

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## Mould Types

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**Deteriogenic** – Species that can cause decay and rot in cellulose rich materials such as timber, wallpaper, plaster board, and cotton.

**Allergenic** – Species which can cause allergic-type reactions with hay fever-type symptoms in sensitive people.

**Pathogenic** – Species which can cause disease and infection in people.

## Discussion & Recommendations

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*Chaetomium*: This fungus produces black fruiting bodies that superficially resemble *Stachybotrys*. It produces strong cellulose enzymes which can breakdown cellulosic material such as wallpaper and GIB paper lining very rapidly (**deteriogenic**). It can also cause soft rots of timber and decay of carpet backing under damp conditions. It is often associated with musty odours and has the potential to produce **allergenic** responses in some people and skin / nail **infection** in immunocompromised people.

*Aspergillus* and *Penicillium* species are common environmental isolates and are often found on damp building materials. These fungi may contribute to high spore levels in the air resulting in **allergenic** reactions in sensitive people.

*Cladosporium* is a mould that is common in the environment. Outdoors, it can be found on plants and other organic matter. Indoors, *Cladosporium* is common in the air and on surfaces such as wallpaper or carpet, particularly where moisture is present. *Cladosporium* is an **allergenic** fungus. *Cladosporium* species are common air-borne contaminants particularly in outdoor air. They are typically found on timber surfaces and will also grow superficially on indoor surfaces that have a moisture level between 15 and 20%, often in response to slightly elevated moisture levels such as condensation. The main effect of the fungus is disfigurement. Although not generally considered toxic, they do have the ability to sporulate heavily and have buoyant and easily dispersed spores which makes this an important fungal airway allergen.

The *Dematiaceous* fungal group are fungi that produce dark fungal spores and/or dark hyphal structures. Many of these fungi are difficult to accurately identify from a microscopic examination alone, but their presence must be considered significant, as they are frequently isolated from water damaged building materials. Many of these fungal types are known to cause **deterioration** of paper and paper products, plastics, textiles, timber etc.

Exposure to *Wallemia* is suspected to cause allergic sensitization.

It is important that repair of the defects that caused the water damage is attended to before any remediation work begins to prevent further contamination and degradation of material.

The presence of fungi always indicates that moisture is or has been present. The types and amounts of fungi identified indicate that there has been a prolonged water problem. It is important to eliminate the source of the moisture and improve the ventilation to prevent further mould growth.

An investigation is required to identify the source of the mould growth. This may involve inspection of wall cavities, ceiling spaces and the exterior cladding. It is recommended that spore trapping is conducted to discover the extent of contamination. Spore traps capture spores, dust, pollen and bacteria from the air for counting and identification. This method does not involve culturing (growing) the sample and thus can identify fungi species and pollen/dust, as well as non viable fungi spores in the environment. Non viable fungi spores can still cause a health issue in susceptible people.

Different responses are required depending on the type of material affected. Hard impermeable materials need to be treated differently to porous, absorbent materials.

The goal of remediation is to remove or clean contaminated materials in a way that prevents fungi and dust contaminated with fungi from entering non-infected areas, while protecting the health of workers performing the remediation.

Note: This is particularly important given that the elderly and sick are present in the building. It may be prudent to consider a professional mould remediation company to undertake this work.

Typically, absorbent materials such as carpets, furnishings, plaster board etc must be removed and disposed of. Impermeable materials such as metal and glass can be decontaminated and re-used. Decontamination of impermeable material involves washing with warm soapy water and thoroughly drying the material before re-installation. The use of bleach is discouraged as it can cause strong odour by reacting with the fungi.

For larger areas remediation must involve the total removal of affected material. This is best carried out by a trained operator, with the contaminated material being removed in sealed plastic bags.

Any contact with the fungi should be carried out by wearing a half face mask with organic vapour cartridges and P2 pre-filters, protective gloves and overalls.

### **Remediation of plasterboard and timber**

A more in-depth assessment of the extent of affected plasterboard and ceiling timber will be required during scoping of the work. Any plaster wall linings where mould is apparent should be removed and replaced.

All building timbers that are significantly affected by soft-rot fungi should be replaced with treated pine, as the strength of these decayed timbers may be compromised. Where timber has mould growth but does not have soft rot damage it is preferable to replace the



timber to control the growth of fungi; however there is the possibility of cleaning and treating the effected timbers. If the timber is left untreated the fungi will cease to grow once the source of moisture is eliminated but dormant growth could restart if rewetting occurs.

### **Remediation of carpets**

All water damaged carpets (and other soft furnishings) showing signs of mould growth should be removed and replaced.

## Laboratory Analysis

### **Biodet Services Ltd**

Consulting Industrial Microbiologists

Unit K, 363 Khyber Pass Road, PO Box 99010, Newmarket, Auckland 1149. Phone: 09-529-1563. E-mail: [biodet@clearnet.nz](mailto:biodet@clearnet.nz). [www.biodet.co.nz](http://www.biodet.co.nz)

11 May 2018

Biodet Ref: 18/35882

Client Ref: 66108

Chemsafety Ltd  
PO Box 8141  
CHRISTCHURCH 8440

Attn: Tony Bird

Dear Tony

Re: **EXAMINATION OF SELLOTAPE® SWAB SAMPLES**

Building/Ref: Haast Clinic, 1962 Jacksons Bay Road, Haast  
Samples taken: 4 May 2018  
Samples received: 8 May 2018  
Samples analysed: 9 May 2018

Laboratory Number	Client Reference	Sample Type	Location
35882/1	91616	Sellotape® swab	4A. Corner Waiting Room, near skirting board
35882/2	91617	Sellotape® swab	4B. Corner Waiting Room, wall
35882/3	91618	Sellotape® swab	5. Store Room, lower north wall
35882/4	91613	Sellotape® swab	1. Under cushions on bench seat in Waiting Room
35882/5	91614	Sellotape® swab	2. Staff and patient toilet
35882/6	91615	Sellotape® swab	3. Store room, north wall

### **MACROSCOPIC AND MICROSCOPIC EXAMINATION**

The samples were examined both macroscopically and microscopically.

### **MEMBER OF NEW ZEALAND ASSOCIATION OF CONSULTING LABORATORIES**

DISCLAIMER: Biodet Services Limited (Biodet) undertakes to exercise due care and skill in the performance of its services and accepts responsibility only for gross negligence proven by the party to whom it has contracted to service the client. The liability of Biodet to the client in respect of any claim for loss/damage in excess of whatever nature and recoverable arising shall in no circumstances exceed a total aggregate sum equal to the amount of the fee payable in respect of the specific service which gave rise to such a claim.

**Biodet Services Ltd**  
Consulting Industrial Microbiologists

Sample ID	Macroscopic features	Microscopic features and comments
35882/1 (91616)	<p><i>Sample:</i> Sellotape® swab</p> <p><i>Appearance:</i> Grey/ black discolouration noted on the tape.</p>	<p><i>Stachybotrys</i> was not detected.</p> <p>Areas of high-level <i>Cladosporium</i>-like growth. Occasional insect parts.</p> <p><i>Conclusion:</i> Likely superficial fungal growth in response to a raised relative humidity.</p>
35882/2 (91617)	<p><i>Sample:</i> Sellotape® swab</p> <p><i>Appearance:</i> Black spotted discolouration noted on the tape.</p>	<p><i>Stachybotrys</i> was not detected.</p> <p>Discrete areas of high-level <i>Cladosporium</i>-like growth.</p> <p><i>Conclusion:</i> Likely superficial fungal growth in response to a raised relative humidity.</p>
35882/3 (91618)	<p><i>Sample:</i> Sellotape® swab</p> <p><i>Appearance:</i> Black spotted discolouration noted on the tape.</p>	<p><i>Stachybotrys</i> was not detected.</p> <p>Discrete areas of moderate-level <i>Cladosporium</i>-like growth and another unidentified fungus.</p> <p><i>Conclusion:</i> Likely superficial fungal growth in response to a raised relative humidity.</p>
35882/4 (91613)	<p><i>Sample:</i> Sellotape® swab</p> <p><i>Appearance:</i> Particulates adhering to the tape.</p>	<p><i>Stachybotrys</i> was not detected.</p> <p>An occasional area of high-level <i>Wallemia</i>. Occasional <i>Penicillium</i>/ <i>Aspergillus</i> spores, <i>Cladosporium</i> and other miscellaneous fungal spores also noted.</p> <p><i>Conclusion:</i> Likely superficial fungal growth in response to a raised relative humidity.</p>
35882/5 (91614)	<p><i>Sample:</i> Sellotape® swab</p> <p><i>Appearance:</i> Faint greyish discolouration noted on the tape.</p>	<p><i>Stachybotrys</i> was not detected.</p> <p>Dense particulates with an unidentified dematiaceous fungus actively growing within the particles. Mites present.</p> <p><i>Conclusion:</i> Likely active fungal growth in response to a damp environment.</p>

Sample ID	Macroscopic features	Microscopic features and comments
35882/6 (91615)	<p><i>Sample:</i> Sellotape® swab</p> <p><i>Appearance:</i> Greyish discolouration noted on the tape.</p>	<p><i>Stachybotrys</i> was not detected.</p> <p>Discrete areas of moderate-level <i>Cladosporium</i>-like growth.</p> <p><i>Conclusion:</i> Likely superficial fungal growth in response to a raised relative humidity.</p>

*Note: Active fungal growth can be determined by the presence of distinct fungal hyphae and structures that readily take up stain.*

## DISCUSSION

The presence of fungi always indicates that moisture is or has been present. It is likely that there has been an increase in relative humidity resulting in areas of superficial fungal growth. It was not clear from the samples whether there were any moisture ingress issues but if there are, it is important that repair of any defects that have led to water damage are attended to promptly. Moisture ingress issues can result in sustained increase in relative humidity that result in the growth of superficial fungi on indoor surfaces.

*Stachybotrys* was not detected suggesting that there was likely insufficient moisture present for the growth of this fungus on the surfaces sampled, but there may be sufficient moisture within wall/ ceiling cavities to allow the growth of this fungus. This must be considered and investigated.

*Cladosporium* species are common air-borne contaminants particularly in outdoor air. They are commonly found on outdoor claddings, particularly timber and will also grow superficially on indoor surfaces that have a moisture level between 15 and 20%, often in response to slightly elevated moisture levels such as condensation. The main effect of the fungus is disfigurement of the surface that the fungus is growing on. Mycotoxin production is generally not associated with this species but the ability to sporulate heavily and have buoyant easily dispersed spores makes this an important fungal airway allergen.

*Wallemia* species are commonly found in house dust and contaminated building materials. These are considered a xerophilic fungus (able to grow in very low-level moisture environments) but are often found associated with very damp building materials. The spores may be allergenic, and the fungus has also been implicated in a condition known as 'Farmers Lung' (a hypersensitivity pneumonitis.)

**Superficial fungi:** *Aspergillus*, *Penicillium* species are common environmental isolates and are often found on damp building materials. These fungi may contribute to high spore levels in the air resulting in allergenic reactions in sensitive people, and many of the species may cause infections in immunocompromised individuals.

**The Dematiaceous Fungal Group.** These are fungi that produce dark fungal spores and/or dark hyphal structures. Many of these fungi are difficult to accurately identify from a microscopic examination alone, but their presence must be considered significant, as they are frequently isolated from water damaged building materials. Many of these fungal types are known to cause deterioration of paper and paper products, plastics, textiles, timber etc. Many are also found as saprophytes (do not cause disease or damage) on plants, leaf litter, timber etc, and are commonly found growing in buildings where condensation has accumulated. They are not generally considered a health issue.

### REMEDIATION<sup>1</sup> OF AREAS AFFECTED BY FUNGI

Different responses are required depending on the extent of the contamination problem and the type of material affected. (Hard impermeable materials need to be treated differently to absorbent materials.) It was not possible to determine the extent of the problem from the samples submitted, but the following is a guide taken from the New York Guidelines:

Repair must be followed by remediation work. The size of the area contaminated by fungi primarily determines the type of remediation. Sizing levels should be based on professional judgement and practicality; currently there is not adequate data to relate the extent of contamination to frequency or severity of health effects. The goal of remediation is to remove or clean contaminated materials in a way that prevents fungi and dust contaminated with fungi from entering non-infected areas, while protecting the health of workers performing the remediation.

Small areas (up to 10 square feet) of fungi on hard impermeable surfaces can be remediated by washing the contaminated area with warm, soapy water and drying well. Hypochlorite should not be used, as this can bind with organic compounds to form chlorophenols. These are very smelly compounds. Hypochlorite used at high concentrations is also an irritant to eyes, throats etc. Any contact with the fungi should be carried out wearing a facemask, protective gloves and overalls.

Absorbent materials that are badly affected by fungal growth would need to be removed in sealed plastic bags.

For larger areas remediation must involve the total removal of affected material. This is best carried out by a trained operator, with the contaminated material being removed in sealed plastic bags. It is important that care is taken to prevent the dried fungal spores from becoming disturbed and contaminating the internal air space.

If the remediation can be completed externally, then there would be little concern about the internal air spaces. Depending on the size and location of a contaminated area it may be necessary to vacate the building while this work is being done. Alternatively, it may be possible to seal off the contaminated area from the indoor spaces.

Care should always be taken when handling any mould-contaminated material.

<sup>1</sup> 'Guidelines on Assessment and Remediation of Fungi in Indoor Environments', New York Department of Health Human Resources Administration. 2008  
 Report 35882

**Biodet Services Ltd**  
*Consulting Industrial Microbiologists*

#### CONCERNS ABOUT HEALTH IMPLICATIONS

Analysis of Sellotape® swabs can assist in determining what fungi are present in the indoor environment, but will only give information about the area swabbed. Hidden fungal growth will not be detected this way.

To establish the extent of the health risks to occupants from any potential fungal growth, the spore-trapping non-culturable sampling method can be used. This can be employed to sample the air quality and determine the types and levels of spores in the indoor environment.

I hope this information is of help to you. If you have any queries please do not hesitate to contact me.

Yours faithfully



Adrienne Burnie  
B.Sc., NZCMT

The samples were tested as received.  
All samples will be kept for three years unless instructed otherwise.  
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Kate Fletcher  
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