

Dr. Damien Louis and Mr. Anthony Gavan

Property at: 38 Black Street, Brighton, VIC 3186

EXPERT REPORT MCTC 2560

Dr Heike Neumeister-Kemp – Senior Mycologist

Best Hooper Lawyers

Mr. Ian Pitt

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AUTHOR: Dr Heike Neumeister-Kemp

DATE: 5 June 2017

Qualifications

- I am an environmental consultant and researcher specialising in environmental mycology. I possess a doctorate degree in nature sciences and have acquired over 22 years of relevant experience.
- I have been involved in consultancy projects, air quality testing, laboratory analysis and training and assessment. I have also published a number of books and peer-reviewed articles and lectured at renowned universities and training organisations in both Germany and Australia.
- I have a Diploma in Biology – Honours (1990), Free University Berlin, Berlin, Germany and also obtained Ph. D., Doctor of Nature Sciences (rerum natura) – First Class Honours (1993), Free University Berlin, Berlin, Germany.
- For further information regarding my areas of expertise, licences/certifications, professional training, experience, expert witness involvement, projects and articles.
- I am the Managing Director and Chief Mycologist of Mycolab and Mycotec Pty Ltd. I have over 22 years of experience as a Mould and Indoor Air Quality Investigator and Consultant. My consultancy services are currently provided via Mycotec Pty Ltd which is part of a large expert group of mycologists, engineers and building consultants, specialized in the consultancy of the remediation of large scale jobs of electronics, biomedical, documents, heritage and antique contents from biological and chemical contamination and the remediation of the related buildings and their HVAC systems.
- I was the managing director and chief Mycologist for the former Mycologia Group (5 companies) mainly involved in building design, IAQ surveys and large-scale project management for mould and asbestos removal.
- I have been involved in the inspection and remediation of over 6.000 buildings in Australia and overseas in the period up to 2013. Since then I solely work as an expert consultant and perform research on new technologies for the inspection and rectification of mould related issues. The inspections I carried out included commercial, government, medical and private residential buildings, specifically covering owner-tenant / owner building disputes.
- In 2005, I jointly authored the Australian Mould Guidelines. This is accepted as a best practice guideline within the mould remediation industry, as recognized by the Specialised Cleaning and Restoration Industry Association (**SCRIA**). The Australian Mould Guideline outlines the identification and remediation of mould growth, health impacts of mould exposure and clearing procedures following remediation (2nd edition in 2010). I also have jointly authored the Mould Worker’s Handbook (2010)¹ outlining the best practices for mould remediation in commercial and domestic buildings.
- I have presented at more than 400 conferences and published more than 100 peer reviewed papers on mould related issues. I have also co-authored the Best Practice Guidelines - HVAC Hygiene (2010, **AIRAH**)². I am a member of the Water Restoration Council for SCRIA, which is currently formulating guidelines for water damage remediation in Australia. I am a member in over 25 associations, and I have lectured at 11 different Universities and 36 other educational institutions. In Australia, I lectured at Murdoch University, Sydney University and ECU, as well as at several TAFE colleges throughout Australia. I currently teach the base unit for sampling techniques for mould for the AIOH.
- I sit on several standard and guideline commissions for IAQ and mould. I was involved in the IICRC standards S520 and currently teach all their mould inspection and remediation courses.
- I am an advisor for the WHO on minimal housing standards and I’m involved in numerous research projects on the effect of mould in national and international projects. I was on the organizing committee for the IAQ conference in Brisbane and also the science producer of the 7 series TV show “Is your house killing you”. I regularly appear on ABC radio and numerous TV channels as an expert advisor.

1. Purpose of report

- 1.1 I have been briefed by Mr. Ian Pitt from Best Hooper Lawyers to provide an expert opinion in respect to mould assessment findings in the above property.

2. Literature or material relied on

- 2.1 I have relied on the following literature and/or material in preparation of this report:
- a. MCTC report 2560 from Mycotec from 4 June 2017
 - b. Expert reports from Dr. Cameron Jones from Biological Health Services from 9 December 2015, 10 December 2015 and 15 January 2016
 - c. Expert report from Brian Murphy from EHS Assess from 17 January 2016
 - d. Expert report from Brett Cole from Biosafety from 14 March 2017

3. Questions to be addressed

- 3.1 I have been asked by Mr. Ian Pitt to address the questions in his letter (e-mail) dated: 31 of May 2017.
- 3.2 The questions on which we seek your advice in the form of a witness statement in the Heritage Victoria format are:
1. Is the building contaminated?
 2. If so what is the nature of the contamination?
 3. Is the contamination a health hazard and if so what are the potential consequences for affected people?
 4. Can the building be remediated as it now is?
 5. If the building cannot be remediated as it now is can it be otherwise remediated and what would that involve?
 6. If it were to be remediated what materials of the existing building could be reused and what would be required to ensure that those materials and the site as a whole it is safe from a health perspective?

4. Background

- 4.1 The term "mould" is typically and commonly used to refer to a group of eukaryotic micro-organisms, of the taxonomic rank Kingdom, referred to as Fungi (Ruggerio et. al. 'A higher-level classification of all living organisms', 2015). Thus herein, the terms "mould" and "fungi" are used interchangeably. The taxonomic rank Kingdom, amongst others, contains the parallel members of Plantae and Animalia. The primary consequence of this classification is that

fungi is neither plant, nor animal, nor bacteria. It therefore follows that fungi/mould is a distinct and 'different' form of life with its own unique characteristics, strengths, susceptibilities and behaviours.

- 4.2 Mould is a ubiquitous micro-organism, numbering some 1.5 million distinct species.
- 4.3 It is typically present, in some form, in all but the most tightly controlled environments, such as clean-rooms where air is filtered by micron-particle filters, and persons entering such clean rooms are decontaminated in air-isolation chambers. The ubiquity of fungi, coupled with the very diverse nature of fungal species, result in almost universal colonisation of surfaces and materials by fungi, such that fungi are found active in environments ranging from the Sahara Desert to the Arctic ice caps. Thus, very few surfaces are free of fungal colonisation, and given the correct conditions such colonisation typically leads to fungal growth potentially contamination.
- 4.4 Given that number of different mould species, moulds exhibit a broad spectrum of characteristics and susceptibilities, all which are heavily dependent upon the specific species in question. That is, moulds exhibit an extensive and disparate set of characteristics and susceptibilities from species-to-species. Further, commonly held perceptions, with respect to bacteria, animals and plants are not necessarily, nor directly, applicable to moulds, especially with respect to cleaning and/or 'killing' mould.

5. Material facts

- 5.1 On the 30th of May 2017 a site inspection was conducted by Mycotec at the above property, subsequently an inspection report was issued on the 4th of June 2017.
- 5.2 Site plan is provided
- 5.3 Dr. Cameron Jones issued 3 reports concerning the above premises with results on mould contamination and brief remediation recommendation
- 5.4 Mr. Brian Murphy and Mr. Brett Cole issued each reports concerning the above premises.

6. MOULD ECOLOGY

- 6.1 The following is a brief overview of mould ecology to aid in the understanding and contextualisation of the answers provided.
- 6.2 Mould proliferation and/or growth on an otherwise uncontaminated substrate requires four elements:
- i) Source of viable mould inoculum (mould spores)

- ii) Source of viable nutrients
- iii) Source of moisture (expressed as the parameter, Water Activity)
- iii) Source of heat energy (expressed as the parameter – Temperature)

- 6.3 All of the above elements are required to support the biological processes that underpin and enable mould growth. Thus, removal or alteration of any one or more of the above elements can either slow or prevent additional mould growth and/or proliferation, that is, inhibit mould. Equally, removal or alteration of any one or more of the above elements may render the mould non-viable, or kill mould.
- 6.5 A notable exception of the above is a mixture of naturally brewed vinegar and water in suitable proportions. Such a mixture is almost universally (against most moulds) fungicidal, this is, it will kill mould by rendering it non-viable. By contrast, bleach is commonly used as an anti-mould agent which, at best, bleach is almost universally fungi static, that is, it's a mould inhibitor.

7. Answers to QUESTIONS

- 7.1 **Question 1:** Is the building contaminated?
- 7.2 Purely from a Mycological perspective, the building exhibits evidence of mould growth and proliferation well beyond that which could be considered normal mould ecology. Therefore it is entirely reasonable to say that the building is "contaminated" with mould.
- 7.3 **Question 2:** If so what is the nature of the contamination?
- 7.4 At the time of sample acquisition, the primary genus detected was *Stachybotrys chartarum*.
- 7.5 **Question 3:** Is the contamination a health hazard and if so what are the potential consequences for affected people?
- 7.6 *Stachybotrys chartarum* is a notorious mycotoxin producer and therefore generally considered a pathogenic mould. Health effects are dependent on individual responses and can range from mild to very severe.
- 7.7 *Stachybotrys chartarum* has been associated with cases of pulmonary hemorrhage, however there is conflicting research on this point. It should be noted that the concern around this fungus is such that, in some circles, the term Stachybotryotoxicosis has been coined to refer to potential health effects from this particular mould genus.
- 7.8 **Question 4:** Given the above, that building requires mould Remediation. Can the building be remediated as it now is?

- 7.9 Remediation from a mould perspective, is herein defined as the activities, techniques, processes etc. undertaken to return of a space, structure or item, to 'normal mould ecology'. There exist several techniques to achieve a Remediated state, including the removal, disposal, and replacement of materials. Thus, any space, structure or item can be Remediated, if suitable replacement materials and items are available.
- 7.10 It should be noted that in this instance, given extensive deconstruction that will be required, and that the vast majority of materials will require disposal and replacement (refer answer below), at some juncture consideration need to be given to what is considered to constitute the original structure/building.
- 7.11 **Question 5:** If the building cannot be remediated as it now is can it be otherwise remediated and what would that involve?
- 7.12 Refer answer above.
- 7.13 **Question 6:** If it were to be remediated what materials of the existing building could be reused and what would be required to ensure that those materials and the site as a whole it is safe from a health perspective?
- 7.14 Purely from a Mycological health effects perspective, Remediation will likely require the removal and disposal of all porous and semi porous materials including but not limited to:
- 7.15 > timber;
- 7.16 > mortar (including brick-joint mortar);
- 7.17 > wall paper;
- 7.18 > plaster board and other gypsum-based materials;
- 7.19 > render (inside and out).
- 7.20 Given that brick-joint mortar will require removal and replacement, the opportunity presents for some partially porous and solid materials such as brick to potentially be successfully Remediated, if bricks are removed from their current location, and individually processed. However, given that typical economic considerations usually preclude such activities, a very limited amount of practical experience exists with respect to Remediation of brick so-affected in such a manner. It is likely that the chance of successfully Remediating brick in this manner would likely be less than 20%.

8. Certification

I, Dr Heike Neumeister-Kemp, have read and understood my obligations under the practice note of the national Heritage Council Hearings Protocol 8Australia:

The factual matters stated within this report are, to the best of my knowledge, true and correct.

I have completed all enquiries that I consider appropriate in formulating my conclusions.

The opinions stated by me within this report are genuinely held by me.

The report contains reference to all matters which I regard as significant.

I understand that my overriding duty as an expert is to assist the Court and have complied with this duty.

I have made all the inquiries that I believe are desirable and appropriate. No matters of significance which I regard as relevant have to my knowledge been withheld from the Heritage Council



Signed: _____

Dr Heike Neumeister-Kemp

Date: 05/06/2017

End of report