Qualified Member
Chartered Institute of Environmental Health

Building Forensics Ltd

Example Building Investigation Report

NOTE:

Sections 1 to 6 are the basic report and sampling locations

Section 7 is advised with the report to assess your mould risks

Sections 8-9-10-11 are sometimes advised depending on health concerns and budget

Section 12 Conclusions

Section 13 Recommendations

CV -Biography

Executive Summary

The property has high levels of hidden decay, and airborne mould spores (genus) are at extremely high levels. The symptoms you have alerted us to are likely the result of an inflammatory response from a toxigenic species. The analysis in section 9 confirms the presence of Mycotoxin triggers and overall a very contaminated wet building

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Report on Building Related Health Issues

Date of inspection

Survey Author Jeff Charlton MCIEH CIEC- CR-WLS-CMH-Hon Fellow BDMA

Section 1 - Preamble

I have the pleasure of forwarding this report, which is based on the information you provided and an inspection of your property coupled with analysis and measurements taken.

No inspection can be 100% reliable, but greater accuracy can be obtained by intrusive demolition and multiple testing protocols. This survey is limited due to cost constraints and does not encompass or indicate all possible building defects or environmental conditions. Any recommendations or conclusions we make must be substantiated before action.

Many illnesses are attributed to poor indoor air quality, and as Indoor Environmental Hygienists, our role is to identify any of these issues. Building-related illnesses can be challenging to treat if contamination persists, and therefore, this survey may be a crucial first step in treatment. Its conclusions should be shared with your medical practitioner or nutritionist, and recommendations should be followed as soon as possible.

Our objective is to identify possible causation but not necessarily all exposure routes, defects, or contamination reservoirs

Where biological growth has occurred, whether bacteria or mould, alive or dead, and indeed fragments, it remains a health hazard. Chemical mycotoxins and/or allergens may cause an inflammatory response decades after the initial incident. Dried fragments may be 40 times more hazardous (ref WHO) than viable growth, so even areas dried from historic water damage events may be a health risk and may be impossible to assess without further intrusive investigation or risk assessment.

Section 2 – Limitations of the Report

The conclusion and recommendation section at the end of the document (pre appendix) is the most important, and the other information is purely supportive"

The author follows recognised protocols; however, some criteria may have been changed to reflect or comply with cost and time issues. Typically, air sampling and evidence gathering should include sampling different premises (apart from the client's) to establish comparative baselines, and air sampling is only a guide. Air sampling is notoriously inaccurate, and although false positives are possible, false negatives are much more likely, and any results should be considered a snapshot in time only.

Air sampling results alone should not be relied upon, and it is the author's experience and knowledge coupled to site-gathered facts which will form the basis of this report's conclusion and recommendations.

The report conclusion and recommendations will revolve around all site and occupant criteria and be a basic risk and hazard assessment.

While cost issues have been emphasised, Building Forensics technician will usually suggest minimal testing and only where considered appropriate.

It should be recognised that any report can be criticised for not doing enough or for noncompliance of recognised standards. Building Forensics balance cost and required results and endeavour to provide useful and economic investigation results.

Building Forensics use recognised standards in their investigations but invariably utilise comparison of target areas against considered unaffected areas. This can include moisture levels of air and substrates and or chemicals and biological activity.

Report Conclusions may indicate the presence of elevated or abnormal contamination. Generally, there is no standard for normal or a healthy home or property, and any conclusions or recommendations are based on a comparison of unaffected areas or the Building Forensics opinion. Normal is almost impossible to interpret as safe due to the potential for reactions with multiple agents, coupled with individual immune responses.

It is, therefore, important to recognise basic risk and hazard protocols where or if hazards and exposure routes may exist. While some moulds are considered toxigenic, risks from allergens can create harmful synergistic effects greater than their individual components

Assessments are made based on probability and usually recognise the most harmful substance as the leading agent. (in accordance with CoSHH)

The bottom line is that occupant health and personal evidence of building-related illness trumps all scientific risk and hazard assessments, and our role is to support the client or patient with measurable evidence or considered sources.

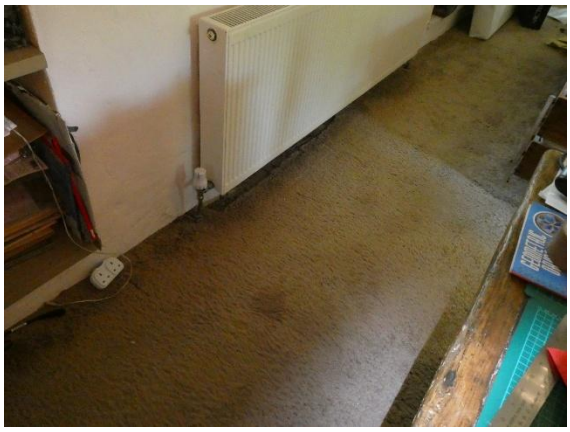
Section 3 - Building Forensics Building Survey (Survey 1)

The objective of the basic survey is to assess current and historical water damage or contamination issues, with a focus on identifying possible evidence of causation. The investigation assessed possible building construction and design defects, alterations to the building envelope and lifestyle and ventilation issues. The report culminates in conclusions and recommendations.

The basis of the report is the formation of an investigation and testing of a hypothesis, which will be tested using the information provided, visual inspection, measurement, and laboratory analysis. The report emphasizes building-related illnesses and the causes or likelihood of possible contamination and moisture issues. This report is not intended to be a building survey, which a RICS surveyor would generally undertake. Please note that an RICS surveyor will not typically conduct a mould or environmental survey.

This survey and inspection assesses and measures areas of concern. Hidden, camouflaged or dry areas, typically in cavities or redecorated, may not be found; however, the biological sampling may identify areas of concern. This, of course, is limited to constraints of the basic report and sampling frequency. Intrusive investigation into cavities may be required but is not a part of this basic investigation

1. **Report basis and considerations**
   - **1.1. Scope or Investigation Parameters**
     - **1.1.1.** To assess the potential for Building building-related illness
   - **1.2. Informed Facts -** We were informed of the following issues:
     - **1.2.1.** Occupants may be suffering from a building-related illness
   - **1.3. Building Type**
     - **1.3.1.** Solid walls and tile
     - **1.3.2.** Concrete Floor
   - **1.4. Visible and olfactory issues**
     - 1.4.1. No Damp Proof Course
     - 1.4.2. No Air bricks
     - 1.4.3. No Roof Vents
     - 1.4.4. No Soffit vents
     - 1.4.5. No ventilation
     - 1.4.6. No trickle vents
     - 1.4.7. Dead wood (mould) stored in lounge
     - 1.4.8. Decaying carpet
     - 1.4.9. Visible mould to carpet
     - 1.4.10. Visible mould specks to walls
     - 1.4.11. Decaying window frames
     - 1.4.12. Gas heater and produces large quantities of moisture



Decaying carpet

No soffit vents and issues with loft ventilation

2. Dust monitoring

2.1.1. The airborne dust concentration is measured in g/m³ or particles defined in ppm, with sizes ranging from 0.1 microns to 10 microns. Typical equipment used is the 6-channel laser particle counter.

2.1.2. Fragments of mould are often in the 2.5-micron range, although spores are invariably more than 10 microns.

2.1.3. Particle counts are taken to assist in the development of the sampling hypothesis. The higher particle counts in association with size provide us with one indicator of possible contamination sources, and this may be where samples are taken.

2.1.4. The results are shown in Table 1 below

Table 1

AREA	Particle Size µ	.3	.5	1.0	2.5	5.0	10
Ambient		16255	6793	1329	217	25	13
Main bedroom		116106	33871	4135	636	99	53
Shower		191649	54628	7869	1121	183	75
Single bedroom		209502	62960	9012	1153	161	85
Kitchen		244872	77360	11163	1444	184	92
Hallway		217447	65223	9033	1203	172	73
Lounge Piano end		294233	103434	13935	1668	256	106
Lounge Table		297677	102064	14516	1612	247	93

2.2. **Conclusions of particles**

2.2.1. Elevated particle counts may sometimes be assumed to be sources of contamination

2.2.2. The highlighted readings above are elevated compared to ambient air and comparison areas

2.2.3. The colour-coded table has no scientific value and is the author's subjective opinion.

2.2.4. The air is extremely contaminated, and although the content of the particulates is unknown, these are extremely high and in my opinion a significant risk

2.3. **Photographic log**

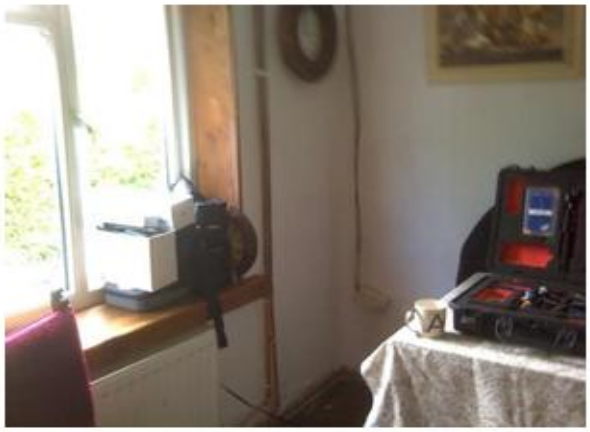
Particle counts

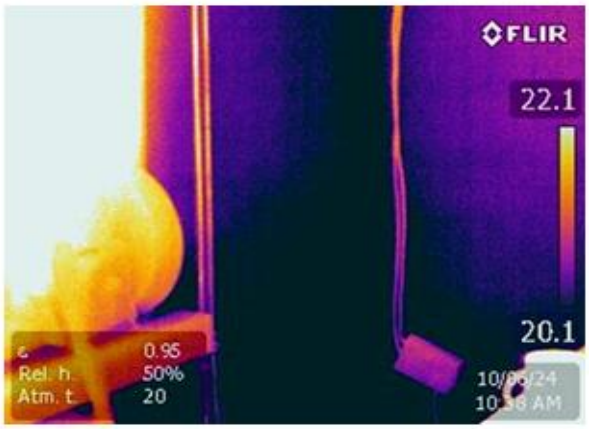
3. Thermal imaging survey

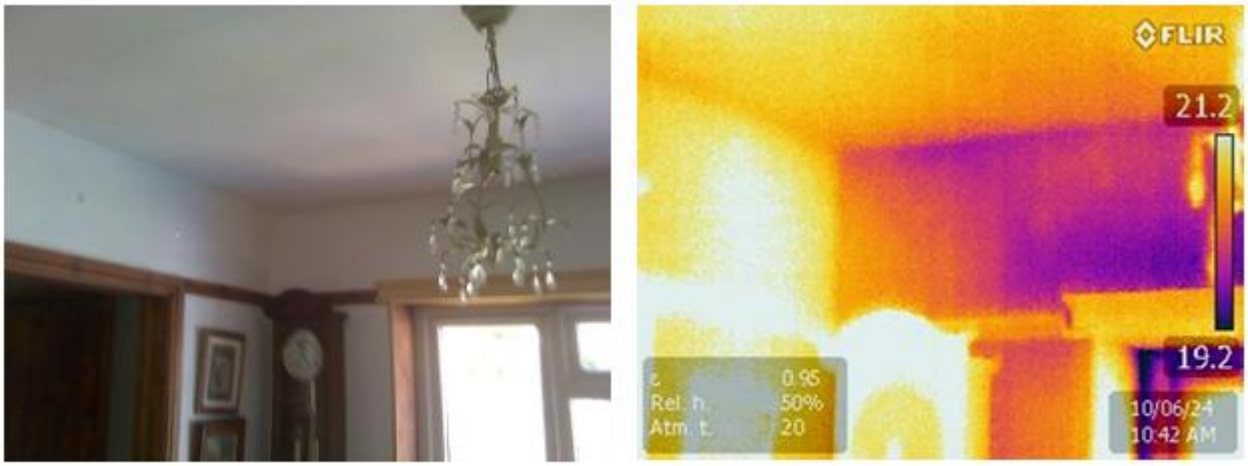
3.1. A thermal imaging camera was used to scan the building envelope and substrates to assess temperature differentials known as ΔT. These scans may identify thermal bridging and poor insulation, which can lead to dew point condensation, indicating that further investigation is required to assess possible leaks, penetrating damp, or wet materials or insulation.

3.2. This survey often forms the basis of the moisture mapping, but darker doesn't necessarily mean the substrate is wet; it can just be cold. Darker areas in the photos can indicate cooler areas, and this may be associated with differing or missing insulation levels, dampness, air leaks, etc

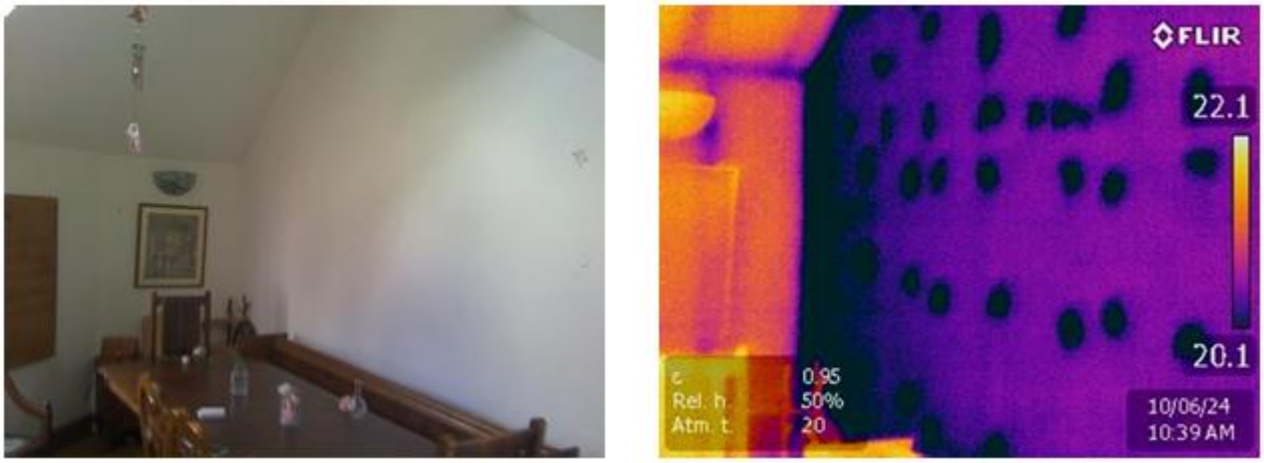
4. The ceiling and adjacent external walls may have condensation issues







Ceiling and wall area in lounge affected by active leak from wet room leak



5. Moisture mapping

5.1.1. The moisture content of various targeted substrates is measured using moisture meters calibrated for the specific material, either with impedance (non-penetrative) or conductive pin meters.

5.1.2. The objective here is to assess moisture issues which may be responsible for current biological amplification. Although areas may appear dry, previous moisture may have caused hidden biological growth, which can remain allergenic or an irritant until removed.

5.1.3. Inflammagens in cavities can be expected to leak out into the occupied spaces.

5.1.4. Measurement is assessed against recognised standards or equilibrium of unaffected areas.

5.1.5. Equilibrium, for this purpose, is the expected homogenous level of moisture in the same material. Where concerns are present, penetrative measurement may be required.

5.1.6. Materials DO NOT have to be wet or saturated for mould growth, and a boundary layer of a few molecules of moisture can exist on top of materials, which is conducive to mould growth. In fact, mould does not grow in wet conditions and prefers damp.

5.1.7. A typical example is mould growth on window glass and refrigerator linings, where the material is non-porous, cold, and internally dry, yet growth still occurs on the surface. In this case, a bio film is often the cause.

5.1.8. Although some materials may be dry, we also look for areas that have been historically wet and it must be recognised that any water damage will result in mould or bacterial amplification within 48 hours.

5.1.9. Biological growth (including mould) prefers damp, dark, warm areas away from UV light and air movement. Ideal growth conditions are found in ceiling, wall and floor cavities. We may make risk assessments in the absence of hard data.

5.2. **Standards of dry**

5.2.1. The tables below show typical limits regarding moisture content of various materials. Taken from British Standards PAS 64 also follows BS8201 and ASTMS F2710. Further information is available in the appendix

Structural material	MC	WME%	ERH
Wood	**16**	**16**	**N/A**
Drywall (plasterboard)	**3.0**	**12**	**N/A**
Plaster	**0.3**	**15**	**N/A**
Brick	**1.5**	**15**	**75**
Concrete	**3.5**	**15**	**75**
Sand cement screed	**6.0**	**15**	**75**

The moisture content of the floor is at 5.5, with 4.5 being an action point. This concrete floor is confirmed to be wet and may be a significant source of elevated humidity throughout the house.

Non-destructive impedance measurement of plasterboard behind the tiles and showing water had penetrated the grouting to wet the plasterboard, resulting in hidden mould growth in the wall cavity between the shower and bedroom

Wet plasterboard wall at 22%wme , with 12% being a trigger point for action

Infrared scanning identified possible moisture at room edges. The conductive moisture probe confirmed the floor is wet at 36% and well above the accepted 20% trigger for mould

Comparison levels indicating lower moisture issue

Comparison levels indicating lower moisture issue with likelihood of mould in cavity

Note

These are standards, but interpretation may be required, particularly where historic water damage is present. Of significant risk is where water damage in high cellulose materials has been allowed to dry naturally.
Of significant importance is the measurement of concrete, floor slabs, and screeds, which require specific and detailed investigation in accordance with British Standards.

The measurement of concrete and screed must follow a recognised protocol, which may require consideration of certain environmental factors and monitoring over a 48-hour period. For simplicity and to contain costs, Building Forensics will adopt an investigative approach to a lesser degree. Where certified evidence is required, a separate instruction will be required

6. Humidity ratio, also known as Specific Humidity

6.1. This is a function of relative humidity and temperature and calculates the actual quantity (weight) of moisture carried in the air based on g/kg of dry air. Variations between rooms and ambient can indicate local moisture issues. A Thermo hygrometer with the probe is used to calculate the humidity ratio. Uncontrolled evaporation will result in moisture being adsorbed into porous hydrophilic materials, and this may result in biological growth. Even nonporous materials can be affected by high humidity ratio especially from dew point. condensation. The following readings with decimal point are taken directly form the meter.

Area	Temp C	RH	Humidity Ratio
Ambient	**17.4**	**49.7**	**6.1**
Main bedroom	**18.8**	**67.7**	**9.1**
Shower	**18.7**	**69.8**	**9.4**
Single bed	**18.2**	**68.3**	**8.9**
Kitchen	**19.6**	**64.7**	**9.2**
Lounge	**17.6**	**68.5**	**8.6**

All reasonable levels

6.2. Conclusions

6.2.1. The table below shows the property has a slightly higher specific humidity compared to ambient air but acceptable levels

6.2.2. Elevated specific humidity may be caused by lifestyle and poor ventilation. Typically, a family of four may produce 15 litres of moisture in the air per day from breathing, cooking, showers etc.

6.2.3. Drying wet clothes inside, not using cooking or bathroom extracts can add to this moisture loading

6.3. Dew Point Condensation

6.3.1. Dew point is the temperature at which warm air holding moisture condenses on colder surfaces, leaving droplets and can result in mould growth. Dew point is measured by taking the temperature of surfaces, usually external walls

6.3.2. External walls measured show temperatures 3 -4 degrees above dew point condensation risk

6.3.3. Photo Log

Wall temperatures are generally 15.5 and the dew point is around 12c

6.4. Conclusion Low dewpoint risk

End of the basic survey and start of additional sampling and analysis.
Please note that we will advise and guide you to the most appropriate sampling and analysis to suit your needs and budget.

Note
While the following Total Spore Count analysis in section 7 is in addition to the preceding basic survey, we always recommend this analysis as a guide to your exposure of mould

7. Total Spore Counts

7.1. This survey has been developed from our experience of building-related illness and the confirmation of risks identified in the basic study 1

7.2. In this sampling protocol, we collect airborne spores in purpose-made, sealed cassettes for laboratory analysis by qualified mycologists. The results are compared to other areas and outside (ambient) air as a control. This type of sampling identifies mould genus but not species. However, the levels are an indicator of risk areas.

Sample Number	Area collected
1	**Bed**
2	**Table**
3	**Ambient**
4	**Piano**

7.3. Note

7.3.1. Mycologists cannot distinguish between Penicillium and Aspergillus. Therefore, reports are stated as Penicillium/Aspergillus, and the report is deemed a risk assessment in terms of counts and types of mould.

7.4. Lab result factors

7.4.1. The following tables are total spores counts (viable dormant and non-viable)

7.4.2. The individual samples should be compared to other areas and the outside (ambient sample)

7.4.3. The results may be influenced by debris loading and other factors, and these findings are an integral part of the methodology. Debris loading is dust which can include skin, dust mite faeces, dander and general fluff/dirt. The level of dust can obliterate the visual detection of spores when viewed under a microscope.

7.4.4. Debris loading is generally rated between 1 and 5, with 5 being very dirty air.

7.4.5. A simplistic explanation is to consider a plate of peanuts with 1-2 -3 -4 -5 bags of flour dropped on top and see if you can count the peanuts through the flour.

7.4.6. The reality is, the dirtier the air, the more the mycologist relies on periphery counts, and this always leads to under estimation

7.5. **The lab report identifies the percentage of count and total spore count**

The standard report displays a column indicating the percentage of sample fields that have been read. That means that for each spore type, the number of spores counted is represented by a certain percentage of fields on which they were observed. It is not the percentage of the total sample

7.6. **Reporting Limits**

The Reporting Limit for a spore type uses the formula listed in the section above and assumes that the lowest raw count that can be detected is one.

7.7. **Lab analysis**

7.7.1. The ambient outside conditions should be compared to inside genus and spore counts (levels), including the percentage identified in the analysis

7.7.2. Note the high debris loading both inside and outside the property, which may occlude visible identification; therefore, spore counts can be assumed to be higher (see note above) Table 42)

7.7.3. Comparison between different locations should also be considered.

7.7.4. The spore counts are extremely high

7.7.5. The lounge is grossly contaminated, but the bedroom is also bad

7.7.6. These identified genus may be considered toxigenic due to levels and environment

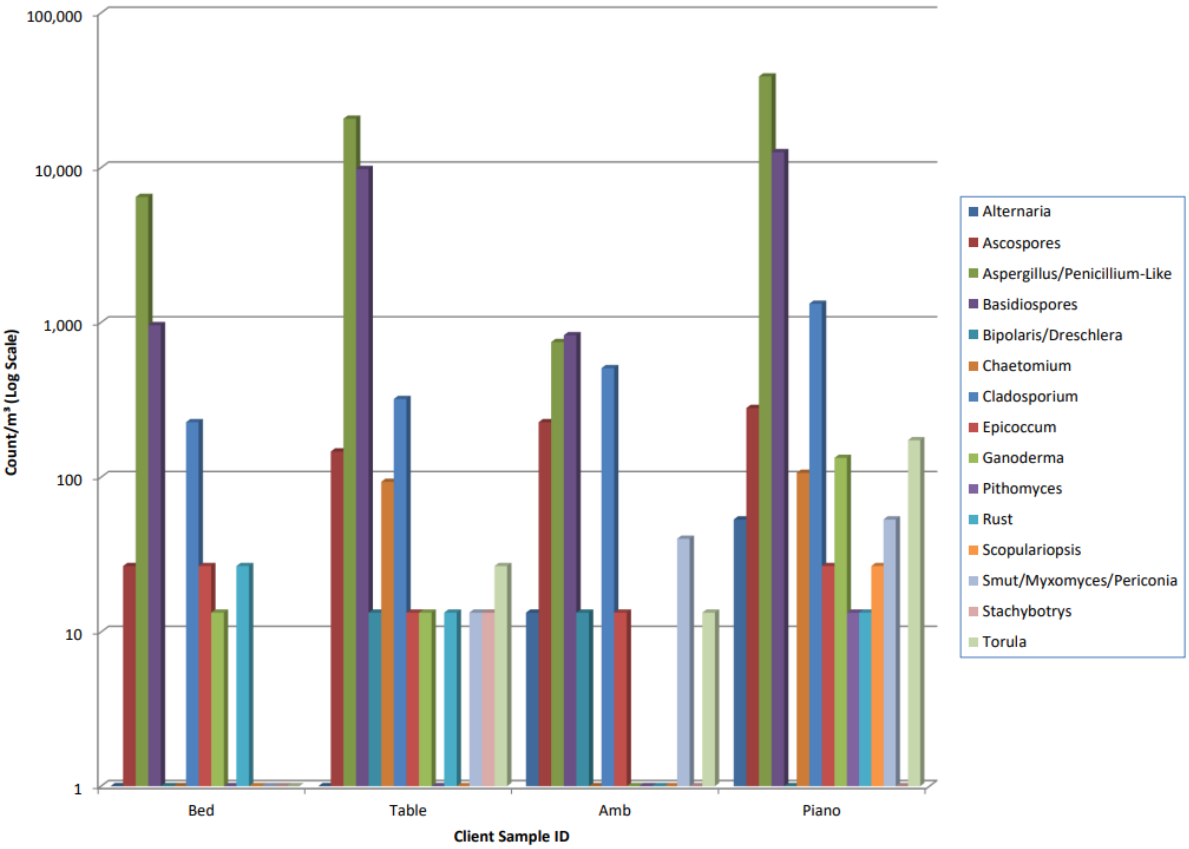
7.8. MOST IMPORTANT INFORMATION

7.8.1. Of major importance is the AMB or ambient (outside count of Aspergillus Penicillium mcount of 747 spores per cubic meter of air against inside the property showing thousands of the same genus

Sample ID:	504964-01	504964-02	504964-03	504964-04
Client Sample ID:	Bed	Table	Amb	Piano
Volume Sampled (L):	75	75	75	75
Media:	Air-O-Cell	Air-O-Cell	Air-O-Cell	Air-O-Cell
Percent of Trace Analyzed:	100% at 600X Magnification	100% at 600X Magnification	100% at 600X Magnification	100% at 600X Magnification

Spore Types	Raw Count	Count/m³	%	Raw Count	Count/m³	%	Raw Count	Count/m³	%	Raw Count	Count/m³	%
Alternaria	–	–	–	–	–	–	1	13	1	4	53	<1
Arthrinium	–	–	–	–	–	–	–	–	–	–	–	–
Ascospores	2	27	<1	11	147	<1	17	227	9	21	280	1
Aspergillus/Penicillium-Like	485	6,467	83	1,553 #	20,707	66	56	747	31	2,914 #	38,853	72
Basidiospores	72	960	12	735 #	9,800	31	62	827	34	945 #	12,600	23
Bipolaris/Dreschlera	–	–	–	1	13	<1	1	13	1	–	–	–
Botrytis	–	–	–	–	–	–	–	–	–	–	–	–
Chaetomium	–	–	–	7	93	<1	–	–	–	8	107	<1
Cladosporium	17	227	3	24	320	1	38	507	21	99	1,320	2
Curvularia	–	–	–	–	–	–	–	–	–	–	–	–
Epicoccum	2	27	<1	1	13	<1	1	13	1	2	27	<1
Fusarium	–	–	–	–	–	–	–	–	–	–	–	–
Ganoderma	1	13	<1	1	13	<1	–	–	–	10	133	<1
Memnoniella	–	–	–	–	–	–	–	–	–	–	–	–
Nigrospora	–	–	–	–	–	–	–	–	–	–	–	–
Oidium/Peronospora	–	–	–	–	–	–	–	–	–	–	–	–
Pithomyces	–	–	–	–	–	–	–	–	–	1	13	<1
Rust	2	27	<1	1	13	<1	–	–	–	1	13	<1
Scopulariopsis	–	–	–	–	–	–	–	–	–	2	27	<1
Smut/Myxomyces/Periconia	–	–	–	1	13	<1	3	40	2	4	53	<1
Stachybotrys	–	–	–	1	13	<1	–	–	–	–	–	–
Torula	–	–	–	2	27	<1	1	13	1	13	173	<1
Ulocladium	–	–	–	–	–	–	–	–	–	–	–	–
Unidentified Spores	–	–	–	–	–	–	–	–	–	–	–	–
Total Spores	**581**	**7,747**		**2,338**	**31,173**		**180**	**2,400**		**4,024**	**53,653**	
Hyphal Fragments	6	80		31	413		4	53		31	413	
Pollen	5	67		22	293		37	493		24	320	
Debris Rating	3			3			3			3		
Detection Limit	13			13			13			13		

Estimation performed due to high count.



Fungal Glossary

Typically found growing outdoors

Considered water damage indicator

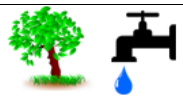
Potential allergen

Potential to produce mycotoxins

Alternaria	
Description	**Characteristic**
These are a common plant pathogen involved in the decomposition of plants. In the indoor environment they are found growing on a variety of substrates including sheetrock and other building materials. They are common allergens causing hay fever or hypersensitivity reactions.	

Anthrinium	
Description	**Characteristic**
These are a plant pathogen found in soil and decomposing plant material. Not typically found growing indoors. One species has been determined to be an allergen.	

Ascospores

Description	Characteristic
These are a very large group of spores that are found everywhere in nature. They are commonly found outdoors and associated with rain and moisture. Some species grow well indoors on damp materials. Ascospores have allergenic potential, however, it is species dependent.	

Aspergillus/Penicillium – Like	
Description	**Characteristic**
These are two of the most common genera in the world. They can be found everywhere in nature, both indoors and outdoors. Indoors they can be found on water damaged wallpaper, carpet, and other organic materials. They can also grow well in conditions of high humidity. Many species are allergens and a common cause of respiratory irritation. Some species are human and animal pathogens and can cause infection.	

Basidiospores	
Description	**Characteristic**
These are primarily comprised of mushrooms and shelf fungi. They are typically found outdoors. Occasionally they are found indoors growing on any organic matter causing dry rot. Some species can be an allergen to sensitive individuals.	

Bipolaris/Dreschlera	
Description	**Characteristic**
These are a plant pathogen typically found outdoors on grasses, grains, and decaying food. Indoors they can be found on plants and building materials. They are an allergen that can affect the nose, skin, eyes and upper respiratory track.	

Botrylis	
Description	**Characteristic**
These are a plant pathogen typically found growing on vegetation particularly in temperate and subtropical climates. Indoors they can be found growing on plants. They are a potential allergen causing hay fever and asthma effects.	

Chaetomium	
Description	**Characteristic**
These are typically found indoors on water damaged cellulose containing materials such as paper, sheetrock, and wallpaper. Not well studied but possible allergen with hay fever and asthma effects.	

Cladosporium

Description	Characteristic
One of the most common genera in both the indoor and outdoor environments. Indoors they grow well in damp environments and areas where condensation builds. They are often found on textiles, window sills, in bathrooms, and A/C systems. They are a common allergen when airborne.	

Curvularia	
Description	**Characteristic**
Primarily found outdoors on plants and soil especially in subtropical and tropical environments. Indoors they grow on a variety of building materials. They are a common allergen causing hay fever, asthma, and allergic fungal sinusitis.	

Epicoccum	
Description	**Characteristic**
Outdoors they are found in the soil, air, and rotting vegetation. Indoors they grow well on a variety of building materials such as paper and textiles. They are a potential allergen with hay fever, asthma, and skin allergy effects.	

Fusarium	
Description	**Characteristic**
Indoors they are typically found under very wet conditions. Some places they can be found are dust in carpet and mattresses, damp walls, wallpaper, and duct liner. They are a potential allergen causing hay fever and asthma effects.	

Ganoderma	
Description	**Characteristic**
These are shelf mushrooms that are typically found growing outdoors on wood causing white rot, root rot, and stem rot. They are a possible allergen at high concentration	

Memnoniella	
Description	**Characteristic**
These are mycotoxin producing spores related to and often found in conjunction with Stachybotrys. These grow well on water damaged cellulose containing building materials such as sheetrock, paper, wallpaper, and textiles.	

Nigrospora	
Description	**Characteristic**

These are typically found on decaying plant material and soil and are usually not found growing indoors. They are a potential allergen causing hay fever and asthma effects.	

Oidium/Peronospora	
Description	**Characteristic**
These are plant pathogens that are common obligate parasites on leaves, stems, flowers, and fruits of higher living plants.	

Pithomyces	
Description	**Characteristic**
These are typically found on dead leaves and stems of plants. Rarely found growing indoors; however, they grow well on paper indoors given the right conditions.	

Rust	
Description	**Characteristic**
These are parasitic plant pathogens that grow on plants, grass, and trees. They are rarely found growing indoors since they require a living host, and therefore typically not found on cellulose containing building materials. They are a potential allergen causing hay fever and asthma effects.	

Smut/Myxomyces/Periconia	
Description	**Characteristic**
This is a grouping of several genera organized together in a general category that are mostly associated with living and decaying plants, wood, soil, grass, cereal crops, weeds, and flowering plants. These are rarely found growing indoors. They are a potential allergen causing hay fever and asthma effects.	

Strachybotrys	
Description	**Characteristic**
These are typically found indoors growing on water damaged cellulose containing building materials such as sheetrock, paper, and ceiling tiles. They are often referred to as "toxic black mold." They have the ability to produce mycotoxins which may cause a burning sensation in the mouth, throat, and nasal passages. Chronic exposure has been known to cause headaches, diarrhea, memory loss, and brain damage.	

Torula	
Description	**Characteristic**

These are typically found growing outdoors on leaves, roots, wood, and soil. Indoors they can be found growing on water damaged cellulose, paper, wicker, straw baskets and ceiling tiles. They are a potential allergen causing hay fever and asthma effects.	

Ulocladium	
Description	**Characteristic**
Requires very wet conditions and can commonly be found indoors in damp or wet areas such as bathrooms, kitchens, basements, and around windows. These grow well on cellulose containing materials such as paper and straw and on water damaged building material such as sheetrock. They are a common allergen causing hay fever and asthma effects.	

Unidentified Spores	
Description	**Characteristic**
This is a grouping of spores that are unable to be categorized due to a variety of reasons. They may be weathered, disfigured, or otherwise lacking the morphological structures necessary to identify the genus.	

Hyphal Fragments	
Description	**Characteristic**
These are branched filamentous structures with cell walls. Hyphae are somewhat analogous to stems or roots in plants whereas the spores would be analogous to the seeds. Large quantities present may indicate an active fungal colony or active fungal growth in the structure	

Pollen	
Description	**Characteristic**
These are a fine to course powdery substance produced by the anthers of seed-bearing plants, trees, grasses, flowers, and weeds. They are an allergen that causes hay fever effects.	

Note that Sections 8-9 provide important additional sampling and analysis to identify the species, thereby determining the risk and hazard levels. These are the primary indicators of building-related illness and can be used to identify mycotoxin exposure.

8. Section 8 Settled dust and QPCR-DNA dust analysis for mould speciation (known as ERMI

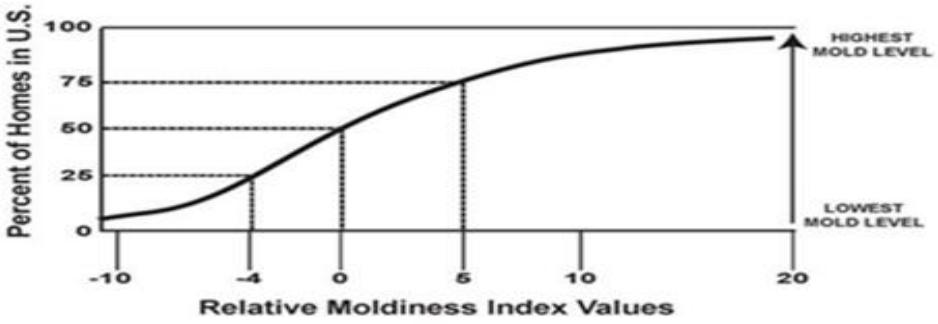
8.1. The ERMI score should not be considered a risk or hazard assessment as we usually collected dust from different areas. The risk score is derived from the presence of Group 1 moulds, which are likely to produce mycotoxins and are known as potentially toxigenic

8.2. These moulds are usually present at detection levels in ambient air and are considered markers of water damage and potential health hazards.

8.3. While some may interpret the levels of ERMI score as a health risk, the reality is we have shown adjacent areas can have differing levels and scores (see our paper on mould sampling failures) in free advice Professional Letter (wpdesign.website)

8.4. The ERMI score has no significant value, but we interpret the actual species as a risk factor. The information regarding group 1 mould species may be of significant benefit to your medical practitioner

8.5. The "Environmental Relative Mold Index" table below (ERMI) shows the typical results from 1096 homes analysed by the Environmental Protection Agency.



8.6. The EPA developers of ERMI categorically state its use is for professional research use only, and no significance as to risk or hazard can be gained from scores

8.7. It should be noted different states and time of year can influence results.

8.8. Building Forensics have in experiment sampled two adjacent rooms and found results differ by orders of magnitude

8.9. No health assessments can be concluded from the ERMI score but the lab results may provide important information regarding restoration and medical treatment and the overall risk and hazards faced in the sampled areas.

8.10. An ERMI score of 0 would represent the average level of mould contamination (50%) of homes investigated. It should be pointed out here that a minus score does not mean there is not a health hazard present or indeed low risk. We have assessed the species particularly in the group one section.

8.11. We do not advocate using the score as a risk assessment. Building Forensics assess species from group 1 only, as a hazard assessment

8.12. Below we have included the risk table for those that may require information on ERMI score

Level	ERMI Values	Interpretation	Comment
Q 1	Less than - 4	Low Relative Moldiness Index	Further investigation is not needed to determine the sources of the mold.
Q 2	-4 to < 0	Low - Medium Relative	Further investigation may be needed to determine the sources of the mold if occupants have been reactive, sensitized, genetically predisposed or otherwise immuno-compromised.
Q 3	0 to < 5	Medium- High Relative	
Q 4	5 to < 20	High Relative Moldiness Index	Source and cause of mold should be determined and remediation is undertaken, reducing the ERMI to levels below Q2.
	> 20	Very High Relative	

Lab analysis Results - Lounge and bedroom

8.12.1. There are several very toxic mould species at levels in excess of 1000 fold higher than normal
8.12.2. The species identified can reduce your immune system, and the species in Group 1 are potentially toxigenic species
8.12.3. The species in group 1 are most likely to be a concern to healthcare professionals who may link your symptoms to exposure.
8.12.4. We do not recommend using the ERMI score to assess health risks. However, the species loading is an extremely important factor in hazard assessment
8.12.5. Your score of 31 is in Q4 and well above the tigger of 15

Group 1: Water Damage Molds			
Species	**Level**	**SE/mg**	
Aspergillus flavus/oryzae		235	* *
Aspergillus fumigatus		61	*
Aspergillus niger		218	*
Aspergillus ochraceus		4	
Aspergillus penicillioides		12,537	*
Aspergillus restrictus		9,311	* * *
Aspergillus sclerotiorum		8	
Aspergillus sydowii		N.D	
Aspergillus unguis		N.D	
Aspergillus versicolor		7,071	* *
Aureobasidium pullulans		5,264	*
Chaetomium globosum		51	*
Cladosporium sphaerospermum		199	
Eurotium (Asp.) amstelodami		12,436	* *
Paecilomyces variotii		N.D	
Penicillium brevicompactum		4,319	* *
Penicillium corylophilum		139	*
Penicillium crustosum		355	*
Penicillium purpurogenum		17	*
Penicillium Spinulosum		52	*
Penicillium variabile		22	
Scopulariopsis brevicaulis/fusca		19	
Scopulariopsis chartarum		224	*
Stachybotrys chartarum		5	
Trichoderma viride		2,937	* *
Wallemia sebi		11,003	*
Sum of logs G1		56.3	

Note
The species identified in Group 2, although not as toxic as Group 1 still have some toxicity and are all potentially allergenic.

Group 2: Common Indoor Molds		
Species	**Level**	**SE/mg**
Acremonium strictum		191 *
Alternaria alternata		6
Aspergillus ustus		23 *
Cladosporium cladosporioides1		8,751
Cladosporium cladosporioides2		317 *
Cladosporium herbarum		1,983 *
Epicoccum nigrum		1,693 *
Mucor amphibiorum		96
Penicillium chrysogenum		7,711 * *
Rhizopus stolonifer		72 *

Sample Size	Sum of logs G2	25.1
5.0	**Ermi Results = (G1-G2)**	31.1

SE = Spore Equivalents
SE/mg = SE/miligrams of sample
Logs = Logarithms
ND = None Detected

(*) Normal
(**) 10 fold higher than normal.
(***) 100 fold higher than normal.
1,000 fold higher than normal.

Environmental Relative Moldiness Index (ERMI)	31.1

8.13. Significant results

Building Forensics have analysed over 750 ERMI scores in the UK

- Your score is almost 2.5 fold higher than UK national average
- Your HERTSMI score is 4 times the level considered safe for CIRS patients to be exposed to. (See note)

9. HERTSMI 2

9.1. This is a risk assessment of hazards identified in the QPCR-DNA sample analysis. In simple terms, this calculation is based on thousands of patients with varying exposures and their personal responses to medications, as recorded by their practitioners. The higher the HERTSMI 2 score is, the less likely the CIRS patient is to respond to treatment while those contaminates remain at high levels

HERTSMI 2 Score - Lounge and bedroom

HERTSMI-2 Species		Spore E./mg	Weighting	
Aspergillus penicillioides		12,537	10	*
Aspergillus versicolor		7,071	10	* *
Chaetomium globosum		51	6	*
Stachybotrys chartarum		5	4	
Wallemia sebi		11,003	10	*
Sample Size	5.0 mg	HERTSMI-2 Score =	40	

9.2. HERTMI 2 Table of risk

Color-coded interpretation [10]	
If 10 or below	In only 1.7% of cases, re-occupancy of building following mold remediation has led to relapse of CIRS-WDB symptoms
If between 11 to 15	Borderline. Further remediation and re-assessment is indicated
If greater than 15	Re-occupancy is ill-advised until further remediation and re-assessment are conclusive.

9.3. Genetically close –related species may be detected in the indicator assay

As reported	Includes
Eurotium (Asp.) amstelodami	E. chevalieri, E. herbariorum, E. rubrum and E. repens.
Penicillium spinulosum	P. glabrum, P. lividum, P. pupurescens, and P. thomii.
Trichoderma viride	T. koningii and T. atroviride.
Aspergillus restrictus	A. caesillus and A. conicus.
Mucor amphibiorum	M. circinelloides, M. hiemalis, M. indicus, M. mucedo, M. racemosus, M. ramosissimus.
Rhizopus zygosporus	R. homothalicus, R. microsporus, R. oligosporus, R. oryzae.
Penicillium crustosum	P. camembertii, P. commune, P. echinulatum, P. solitum.
Aspergillus niger	Know called Aspergillus basiliensis
Scopulariopsis brevicaulis/fusca	Has been renamed as species of Microascus [10]
Wallemia sebi	W. mellicola, W. canadensis [11]

Section 10 Endotoxins

This is an addition but not usually recommended unless the budget allows and in particular where long-term mould treatments have failed and especially where black water events/flooding has occurred and or stomach issues persist

10. Endotoxins - Lounge and bedroom

This score is low, and endotoxins are not an issue

Reference Number	Locations	Result EU/mg	Q Level
410797-2	Lounge + Bedroom	**24**	**Q 1**

Color-coded interpretation	
If 100 or below	Recommended for CIRS.
If 200 or below	Recommended for No CIRS.
If greater than 200	Remediation is needed.

11 Actinomycetes

Actinomycosis is believed to play a major part in building-related illnesses and may be responsible for many symptoms sometimes misdiagnosed as mould illness and CIRS.

11 - Lounge and bedroom

Actino Score	23
Pathogen Score (Q Level)	Q4
Black Water Score (Q Level)	Q1

Actino Score interpretation (Water Damage)	
20 or below	Indicative of a Healthy Building
Between 21 to 23	Further investigation needed
Greater than 24	Suggestive of Building Related Illness.

	Total Species	Pathogen Species	Be/mg Total	Q Level
Bacteria	3,074	214	8,583,513	Q 4
Actino	708	61		

Summary of Bacteria's Order

Orders Detected	Abundance B.E/mg	Families	Abundance	Fold ▲	Diversity	Fold ▲	Pathogen
Actinomycetales	1,106,585	41	23 %	0.9	15.7 %	0.9	61
Bacillales	857,964	14	18 %	1.4	5.4 %	0.8	24
Clostridiales	373,495	25	8 %	2.5	9.6 %	1.2	36
Rhizobiales	190,651	13	4 %	1.5	5.0 %	1.1	1
Rhodospirillales	172,874	3	4 %	0.8	1.1 %	0.7	0
Acidimicrobiales	122,831	3	3 %	5.8	1.1 %	0.9	0
Rhodobacterales	116,230	1	2 %	0.9	0.4 %	0.6	0
Sphingomonadales	115,543	2	2 %	1.8	0.8 %	0.8	0
Gaiellales	112,873	1	2 %	1.7	0.4 %	0.3	0
Solirubrobacterales	94,334	3	2 %	6.0	1.1 %	1.0	0

▲ = Fold over normal top orders

Table only list 10

Q1 Quartile **Q2 Quartile** **Q3 Quartile** **Q4 Quartile**

B.E	= Bacteria Equivalents	Logs	= Logarithms
B.E/mg	= B.E/miligrams of sample	ND	= None Detected

(* *) 100 fold higher than normal.
(* * *) 1,000 fold higher than normal.

P = Human Pathogen

Normal values are based on bacteria distribution in 1,000 US homes. Distribution of bacteria species are also ranked on Quadriles, only elevated species are highlighted with a color code for Q3 and Q4.

Actino Species Detected

	Genus & Species	B.E/mg	Comments	Q Level
1	Actinomyces funkei	343 P		
2	Actinomyces massiliensis	343		
3	Actinomyces naeslundii	343 P		
4	Actinomyces nasicola	86		
5	Actinomyces odontolyticus	1,803 P		
6	Actinomyces viscosus	172 P		
19	Corynebacterium amycolatum	5,751 P		
20	Corynebacterium appendicis	28,669	*	
21	Corynebacterium aurimucosum	4,893		
22	Corynebacterium capitovis	515		
23	Corynebacterium glycinophilum	343		
24	Corynebacterium imitans	5,064 P		
25	Corynebacterium jeddahense	601		

26	Corynebacterium jeikeium	23,004 P	*	
27	Corynebacterium kroppenstedtii	4,034 P		
28	Corynebacterium lactis	429		
29	Corynebacterium macginleyi	429 P		
30	Corynebacterium pilbarense	21,373		
31	Corynebacterium pilosum	86		
32	Corynebacterium simulans	6,094 P		
33	Corynebacterium singulare	43,347		
34	Corynebacterium sputi	172		
35	Corynebacterium suicordis	601 P		
36	Corynebacterium tapiri	343		
37	Corynebacterium thomssenii	7,124 P		
38	Corynebacterium tuberculostearicum	255,617 P		
39	Corynebacterium ureicelerivorans	4,635 P		
40	Corynebacterium uterequi	172		
43	Cryobacterium arcticum	343		
61	Mycobacterium aichiense	1,373 P		
62	Mycobacterium arabiense	343		
63	Mycobacterium cookii	172		
64	Mycobacterium duvalii	1,373		
65	Mycobacterium hippocampi	343		
66	Mycobacterium hodleri	1,545		
67	Mycobacterium holsaticum	172		
68	Mycobacterium insubricum	86 P		
69	Mycobacterium iranicum	343		
70	Mycobacterium madagascariense	3,348		
71	Mycobacterium moriokaense	1,202		
72	Mycobacterium parafortuitum	258		
73	Mycobacterium rhodesiae	258		
74	Mycobacterium sediminis	1,631		
75	Mycobacterium sphagni	343		
82	Propionibacterium acidipropionici	687		
83	Propionibacterium acnes	28,411 P		
84	Propionibacterium cyclohexanicum	86		
85	Propionibacterium jensenii	172		
87	Streptomyces aidingensis	172		

88	Streptomyces carpaticus	343			
89	Streptomyces graminilatus	429			
90	Streptomyces nanshensis	172			
91	Streptomyces panacagri	172			

Other Elevated Species Detected

	Genus & Species	B.E/mg	Comments		Q Level
1	Acetivibrio cellulolyticus	1,888			
2	Acetivibrio ethanolgignens	429	P		
3	Agromyces ramosus	4,463		*	
4	Alkaliphilus oremlandii	773			
5	Amaricoccus macauensis	12,103		*	
6	Ammoniphilus oxalaticus	10,472		*	
7	Anaerobacterium chartisolvens	7,983			
8	Anaerococcus nagyae	2,146			
9	Anaerococcus provenciensis	2,747			
10	Anaerococcus senegalensis	601			
11	Anaerococcus vaginalis	773	P		
12	Arthrobacter russicus	2,318		*	
13	Bacillus asahii	7,210		*	
14	Bacillus benzoevorans	19,914		*	
15	Bacillus circulans	48,411		*	
16	Bacillus coagulans	5,837		*	
17	Bacillus foraminis	4,120		*	
18	Bacillus nealsonii	107,466		*	*
19	Bacillus niacini	23,261		*	
20	Bacillus oceanisediminis	27,982		*	
21	Bacillus psychrosaccharolyticus	28,154		*	
22	Beijerinckia mobilis	8,412		*	
23	Blautia faecis	2,747			
24	Blautia luti	6,953			
25	Catabacter hongkongensis	429			
26	Coprococcus eutactus	7,124		*	
27	Corynebacterium accolens	14,077	P	*	
28	Corynebacterium massiliense	5,408		*	

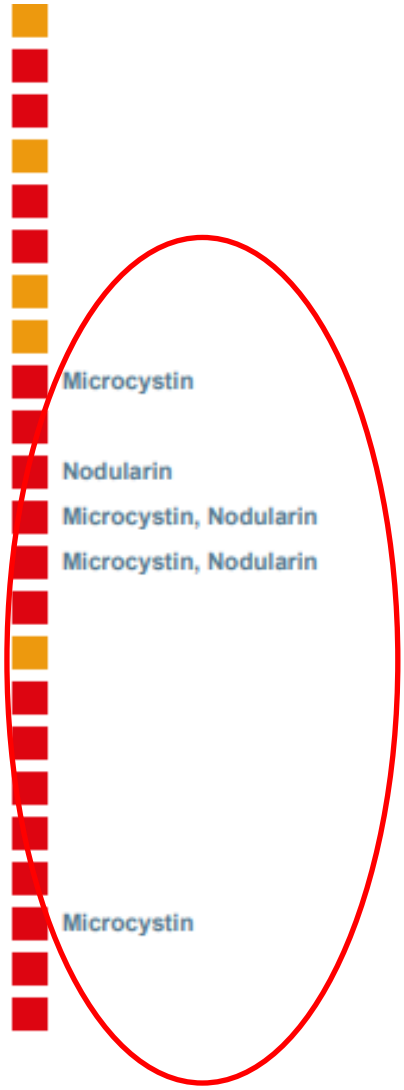
29	Defluviicoccus vanus	77,080	*	
30	Diplorickettsia massiliensis	11,159	*	
31	Dorea longicatena	2,747		
32	Dyadobacter hamtensis	4,721	*	
33	Eubacterium coprostanoligenes	2,146		
34	Finegoldia magna	11,244 P	*	
35	Friedmanniella antarctica	4,721	*	
36	Fusicatenibacter saccharivorans	3,691		
37	Gaiella occulta	112,873	*	
38	Garciella nitratireducens	1,288		
39	Gemmiger formicilis	4,549		
40	Gracilibacter thermotolerans	4,463		
41	Hydrogenispora ethanolica	3,605		
42	Hyphomicrobium vulgare	11,588	*	
43	Intestinimonas butyriciproducens	773		
44	Kocuria palustris	83,088	*	
45	Luteolibacter luojiensis	7,725	*	
46	Microlunatus ginsengisoli	6,695	*	
47	Microlunatus phosphovorus	12,446	*	
48	Nocardioides islandensis	17,854	*	
49	Oceanibacterium hippocampi	22,489	*	
50	Paenibacillus contaminans	6,094	*	
51	Paenisporosarcina macmurdoensis	3,691	*	
52	Pantoea agglomerans	687 P		
53	Pantoea vagans	2,489		
54	Papillibacter cinnamivorans	515		
55	Peptoniphilus grossensis	3,863		
56	Prevotella copri	14,420	*	
57	Pseudonocardia yuanmonensis	28,326	*	
58	Rickettsia typhi	14,077 P	*	
59	Rubellimicrobium mesophilum	17,510	*	
60	Rubellimicrobium roseum	12,189	*	
61	Ruminococcus callidus	4,721	*	
62	Siccibacter turicensis	258		
63	Solirubrobacter ginsenosidimutans	40,428	*	
64	Sporacetigenium mesophilum	3,004		

65	Sporosarcina contaminans	11,244		*	
66	Staphylococcus devriesei	15,279		*	
67	Staphylococcus haemolyticus	10,987	P	*	
68	Staphylococcus saprophyticus	8,669	P	*	
69	Symbiobacterium terraclitae	687			
70	Thermoflavimicrobium dichotomicum	6,094		*	
71	Turicibacter sanguinis	17,081		*	
72	unidentified bacterium	1,717		*	

Cyanobacteria Species Detected

	Genus & Species	B.E/mg	Comments	Q Level
1	Aerosakkonema funiforme	343		
2	Anabaena cylindrica	1,030		
3	Anabaena flosUnclassifiedaquae	515		Microcystin
4	Anabaena sp	2,232		Anatoxin-a, Microcystin
5	Aphanizomenon flosUnclassifiedaquae	2,918		Cylindrospermopsins, Saxitoxin
6	Brasilonema bromeliae	3,262		
7	Brasilonema terrestre	4,206		
8	Calochaete cimrmanii	773		
9	Calothrix desertica	1,717		
10	Calothrix elsteri	258		
11	Chamaesiphon minutus	2,403		
12	Chroococcidiopsis thermalis	1,030		
13	Coleofasciculus chthonoplastes	86		
14	Crinalium epipsammum	343		
15	Crocosphaera watsonii	258		
16	Cyanobacterium aponinum	86		
17	Cyanobacterium stanieri	258		
18	Cyanospira rippkae	343		
19	Cylindrospermum siamensis	3,262		
20	Cylindrospermum stagnale	6,781		
21	Fischerella muscicola	86		
22	Gloeobacter kilaueensis	343		
23	Gloeothece membranacea	86		
24	Halomicronema excentricum	944		

25	Halospirulina tapeticola	172		
26	Hassallia andreassenii	343		
27	Hassallia antarctica	2,489		
28	Iphinoe spelaeobios	86		
29	Kastovskya adunca	515		
30	Leptolyngbya foveolarum	858		
31	Loriellopsis cavernicola	172		
32	Lyngbya aestuarii	86		
33	Microcystis aeruginosa	343		Microcystin
34	Myxosarcina sp	5,751		
35	Nodularia spumigena	5,322	*	Nodularin
36	Nostoc sp	6,438		Microcystin, Nodularin
37	Nostoc sp	5,064		Microcystin, Nodularin
38	Oscillatoria neglecta	1,202		
39	Oxynema thaianum	172		
40	Phormidium etoshii	429		
41	Planktothricoides raciborskii	2,232		
42	Pleurocapsa sp	1,202		
43	Starria zimbabweensis	1,030		
44	Synechococcus elongatus	172		
45	Synechococcus sp	258		Microcystin
46	Tolypothrix sp	258		
47	Tychonema bourrellyi	515		



ACTINO INDEX

Human Habitat (HH)

Species	B.E/mg		
Actinomadura chibensis	ND		
Actinomyces canis	ND		
Actinomyces europaeus	86	P	*
Actinomyces meyeri	ND		
Actinomyces neuii	86	P	
Actinomyces odontolyticus	1,803	P	*
Actinomyces turicensis	2,146	P	**
Corynebacterium accolens	14,077	P	**
Corynebacterium amycolatum	5,751	P	*
Corynebacterium argentoratense	ND		
Corynebacterium coyleae	429	P	*
Corynebacterium falsenii	172	P	
Corynebacterium glucuronolyticum	ND		
Corynebacterium hansenii	ND		
Corynebacterium imitans	5,064	P	
Corynebacterium jeikeium	23,004	P	**
Corynebacterium kroppenstedtii	4,034	P	
Corynebacterium matruchotii	86	P	
Corynebacterium minutissimum	ND		
Corynebacterium propinquum	ND		
Corynebacterium resistens	ND		
Corynebacterium riegelii	172	P	*
Corynebacterium simulans	6,094	P	**
Corynebacterium striatum	86	P	
Corynebacterium sundsvallense	ND		
Corynebacterium tuberculostearicum	255,617	P	**
Corynebacterium ureicelerivorans	4,635	P	*
Corynebacterium xerosis	ND		
Dermatophilus congolensis	172	P	
Propionibacterium acnes	28,411	P	*
Propionibacterium avidum	858	P	*
Propionibacterium granulosum	429	P	*
Rothia mucilaginosa	858	P	*

Soil Habitat (SH)

Species	B.E/mg		
Arthrobacter creatinolyticus	ND		
Arthrobacter crystallopoietes	86	P	
Brevibacterium mcbrellneri	258	P	*
Brevibacterium paucivorans	3,691	P	**
Clavibacter michiganensis	1,288	P	*
Curtobacterium flaccumfaciens	2,403	P	*
Gordonia terrae	86	P	
Nocardia higoensis	ND		
Rathayibacter tritici	ND		
Rhodococcus equi	ND		
Rhodococcus fascians	ND		
Saccharopolyspora rectivirgula	1,202	P	
Sanguibacter suarezii	429	P	*

B.E = Bacteria Equivalents
BE/mg = BE/milligrams of sample
ND = None Detected
P = Human Pathogen

(*) 5 fold higher than normal.
(**) 50 fold higher than normal.
(***) 500 fold higher than normal.

Normal values is based on bacteria distribution on 1,000 US homes.

Dominance Index (DI)	**1.1**
Prevalence Index (PI)	**0.8**

Dominance Index (DI)	Lower than 2.0	Likely safe for CIRS
	Higher than 2.0	Likely not safe for CIRS
Prevalence Index (PI)	Lower than 2.0	Likely safe for CIRS
	Higher than 2.0	Likely not safe for CIRS

Bacteria analysis results

The colour coded provided by the lab shows your home to be in the fourth quantile or basically contamination above 75% worse than average homes.
You have bacteria present that are associated with cancer, including Liver and respiratory paralysis. You have another bacteria species associated with cancer, and it can cause a protein phosphatase inhibition. The levels identified from this single sample are NOT very high, but you should be aware of their presence.

12. Conclusions

12.1. The following conclusions are based on the information provided to us or gathered through the survey, coupled with laboratory analysis and monitoring equipment. While this report was written by a qualified expert in Indoor Environmental Health, you must recognise that this report is a basic, non-intrusive survey and represents a snapshot in time. You should confirm all findings before making life-changing decisions

12.2. The air is extremely contaminated

12.3. Surfaces an

12.4. The moisture content in the walls is elevated at the bottom compared to higher up the wall, and this may be indicative of rising damp

12.5. **T**he roof has no ventilation, and the loft is an issue

12.6. The levels of airborne contamination, in terms of spore counts, are extremely high and must be reduced; the source and causation must be remediated

12.7. The Gram-negative bacteria is at low levels and not considered an issue.

12.8. The Gram-positive Actino levels are a little high, and I respectfully suggest you forward these results to your healthcare professional

12.9. The property and contents are extremely contaminated and are, in my opinion, a serious health risk.

12.10. The health symptoms you described to me could, I believe, be directly attributable to building-related contamination

12.11. If you have not yet engaged a healthcare professional or need some guidance, please come back to Building Forensics, and we will provide free self-help guidance and a list of appropriate healthcare support specialists

13. Recommendations

The property should have contents risk assessed for decontamination or replacement. We can provide free guidance upon request, and if you are pursuing a claim, we can offer advice as well.

The roof and insulation issues must be fixed, with insulation and ventilation a priority
The guarantee on the new floor should be reviewed, and we can provide free supportive information and guidance on this.

I recommend a new ventilation system be installed, such as HRVS, as noted in section 16 below
The property must be professionally decontaminated, and immediate risk reduction and knockdown of airborne contaminates must be considered if you remain in the property. This will be a temporary risk reduction only until such time as remediation is undertaken.

We can decontaminate the property to various levels of risk reduction. However, costs and budget may dictate the outcome.
You will GOOGLE decontamination companies, and you will find a variety of guaranteed results. You should review these carefully, and as our client, Building Forensics will provide an unbiased, clear, and concise opinion on whoever or whatever you choose.

I would warn that any process costing under £2000 and completed in a day or two is unlikely to provide any form of worthwhile result, and as our client, we offer you this simple advice

Advice
If a contractor offers a magic service, let them know that you will be verifying their clearance results through Total Spore Counts and ERMI swabs provided by Building Forensic, and to save you costs, we would support your DIY testing through Mouldlab.co.uk

14. Decontamination Warning and Conflicts of Interest

If you have been diagnosed with CIRS or building-related illness and treatment has been unsuccessful or symptoms have worsened, you should discuss this report with your healthcare professional. If your doctor confirms the presence of potential contaminates in your home, you may require decontamination. This means that you require a totally different end result from the usually advertised "Mould Removal Services.' The contamination that triggers an inflammatory response is nonviable, dead, and, in fact, chemical allergens and toxins, and will not be resolved by visible mould removal.

You might find the information on our website helpful, which shows different forms of decontamination with both benefits and shortfalls www.buidingforensics.co.uk or https://buildingforensics.co.uk/decontamination-2/

The UK's most experienced and qualified expert in decontamination and building-related illness and here to help you.

CV Biography of Jeff Charlton 07990 500 999

Over 35 years in disaster recovery, restoration and decontamination. Counter-terrorism, specialising in the defence of buildings and protection of occupants. Contingency planning and resilience. Focusing on building-related illness since 2010

1. Member of Surviving Mold (sic) and International Society for Environmental Acquired Illness (ISEAI) group of Indoor Environmental Hygienists

2. Board-certified Indoor Environmental Professional Listed in Council Certified Indoor Environmental Consultant

3. Certified Member of Chartered Institute of Environmental Health UK

4. Scientific member British Environmental Medicine Society

5. Contracted to European Commission on Terrorist CBRN planning and response. Scientific Committee on Health, Environmental and Emerging Risks (SCHEER) https://ec.europa.eu/health/scientific_committees/scheer_en

6. Qualified member of the Emergency Planning Society professional working group on terrorism CBRN

7. Certified concrete slab testing USA

8. Two published peer-reviewed papers on mould illness and assessments

9. Worked with Mi5 at Thames house in a team to design building defence against terrorist CBR attack in the capital and central business district. From my developed www.cbr-response.com web site and basis for BRE paper.
10. Presented to House of Commons select committee on failures in flood response and recovery. Ref EV w2 https://publications.parliament.uk/pa/cm201314/cmselect/cmenvfru/330/330vw.pdf

11. Worked with National Counter Terrorist Office (Chris Philips) at Thames House rolling out national program on CBRN defence and awareness /response
12. Worked with Police at Central training college to assess Lockerbie and local response to widespread disaster and secondary attack by insurgents
13. Worked with police at Ryton police CBRN centre to develop strategies to evacuate and protect CBRN casualties
14. Worked with National Health and fire services to audit response to terrorist attack in Reading hospital and local shopping mal
15. Worked with Emergency Planners at Morton in Marsh to develop contingency plans for wide spread natural or terrorist radiological event
16. Working with Cabinet office and Government decontamination service, wrote and presented terrorist CBR attack on London shopping centre using available CBR agents designed to be lethal in combination.
17. Provided a review of CBR terrorist response at RUSI (Whitehall) https://rusi.org/publication/contingency-plans-terrorist-cbr-attack

18. Presented various strategies on natural disaster recovery techniques to

Emergency Planning Society

19. Visiting lecturer at Cranfield Royal Military College in CBRNe (Tony Moor)
20. Presented CBRN defence protocols to FBI and Homeland Security in Kentucky USA
21. Provided seminars to Emergency planners on flood and disaster recovery
22. Developed novel techniques for IED detection and presented at Porton Down
23. Provided seminars at EMP conference on Gaussian dispersal around Hot Zones and PPE limitations of emergency responders
24. Sat on EU committee in Brussels on CWA 16106.10 for the development and publication of victim and emergency services response to terrorist CBRN event. Now a British standard
25. Provided a CBRN terrorism scenario on shipping

    http://gcaptain.com/what-if-chemical-biological-radiation-attack-san-francisco/
26. Speaker CBRN conference USA with Homeland Defense & FBI

    https://www.slideshare.net/dirrtybass/cbrn2011pdfw

- Over 30 years worldwide experience in disaster recovery and restoration involving floods, fires and explosions as well as general and specific decontamination and sanitation, including mould and associated biological contaminants.
- Trained with internationally recognised industry leaders such as Cliff Zlotnik, Pat Moffatt, Marty King, Jim Holland and Professor Ronald Alvin and Tony Gibbs (Porton Down) in all areas of disaster recovery, restoration and decontamination.
- Obtained highest practical and technically appropriate qualifications throughout career. I have been Involved with mould & biological health issues since 1999. Initially obtained US qualifications, as Britain had none.
- Made initial funding available and became founding chairman of British Damage Management Association UK.
- Achieved accredited associate membership with Chartered Institute of Environmental Health and USA Board Certified (ANSI) Certified Indoor Environmental Consultant
- Post-Gulf War in Kuwait at times employing over 500 decontamination personnel working in hazardous conditions to restore hotels, oil fields and strategic government buildings. Provide scope of works to US Corps of Engineers for restoration of Emirs' palaces, Ministries of Electricity and Water and ministry of Awqaf and Islamic affairs.
- Working with world-wide organisations, exposed to the very best technology and forensic investigators and have applied their technologies, approach and resources in the UK.
- Skilled in using state of the art analysis and measurement technology and equipment. I have established strong links with specialists in affiliated industries to provide supporting expertise and evidence. This includes utilising ISO accredited laboratories, particularly in Indoor Air Quality (IAQ) testing.
- Acted as both consulting and testifying expert in various disputes, including testimony as

Sole Joint Expert under Part 35 and including the Financial Ombudsman, in cases involving building related damage, design and construction defects, toxic mould identification and analysis, and building related health effects.

- Successfully challenged UK experts and laboratories on possible building contamination and exposure issues, providing clear evidence and repeatable laboratory analysis complying with the World Health Organization Guidelines for Indoor Air Quality "Dampness and Mould" (2009) and reflecting British Standards.
- Peer-voted awards, including Contingency Insurance Risk (CIR) Lifetime Achievement Award (2013), CIR Disaster Recovery of the Year (2001, 1999) shortlist (2002), as well as awards for Innovative Product (BANG 2010, CIR 2010, and CBON 2001, training in counter terrorism).
- Participated on Standards, Setting professional bodies; training; emergency planning seminars.

- Invited to speak in House of Commons at Parliamentary Joint Committee on Flood Insurance headed by Jonathan Evans MP to provide evidence on flood restoration and criticising industry response February 2014
- Frequent guest on Sky TV, BBC TV and radio, ITV and Channel 4.
- Participated as invited technical expert to EU and British standards committees on diverse issues covering Business Continuity, Disaster Recovery and Counter Terrorism and victim support and response to terrorist CBR event.
- Visiting lecturer in counter terrorism at Cranfield Royal Military College under Tony Moore, speaker at various international conferences on counter terrorism and specializing in CBRN events and pandemic contingency planning, including FBI and Homeland Defence.
- Short listed Emergency Planning Society in 2014 Innovative training awards in disaster recovery
- Designed and presented novel solutions to Car bomb and road side IEDs to Ministry of Defence at Porton Down 2011
- 2018 Wrote and presented a seminar on anthrax and CBR decontamination at MOD Larkhill Garrison for and on behalf of Emergency Planners, CBRN professional working group at Salisbury.
- **SELECTED PROFESSIONAL QUALIFICATION AND ACCREDITATIONS**

  Please note all subscriptions and positions ceased and copies all certificates can be seen on https://www.buildingforensics.co.uk/our-accreditation.html

- **Recovery and Restoration**. The following certifications cover all aspects of disaster recovery and restoration:
- Certified Restorer USA (highest recognised industry certification)
- BDMA Senior Technician UK (Co-founded BDMA; Honorary Fellow; wrote the syllabus and exam questions)
- **Business Continuity**. Certified member BCI (relinquished)
- Chair London Forum Business Continuity Institute (relinquished)
- Co-founder BANG (alternative to BCI)

Water Damage.

- Water Loss Specialist (RIA ASCR) Highest USA certification
- Applied Structural Drying Hydro lab USA

- Achieved Instructor status (95%+ with: IICRC; RIA; Drieaze;
- Provided technical input to IICRC S500 ANSI and S520 standards
- Wrote BDMA's current Technical Guidelines and Standards 2014, (BDMA refused to accept at executive level due to my refusal to drop toxic mould issues)

Environmental Hygienist

- Member Chartered Institute of Environmental Health (UK)
- Council Certified Indoor Environmental Consultant (USA) (ANSI)

Fire Damage.

- IICRC Instructor status

Mould.

- Indoor Environmental Surveys ET&T USA
- American Congress of Governmental Industrial Hygienists 2002
- Applied Microbial remediation Technician Restoration Consultants S520 USA
- IICRC AMRT
- American Council for Accredited Certification Indoor Environmental Consultant

Asbestos.

- Qualified and certified by British Institute of Occupational Health P405& P401
- Licensed Asbestos removal supervisor; licensed asbestos contractor (relinquished)

Engineering.

- ONC engineering
- City & Guilds Mechanical Craft Practice 1 & 11
- Certified associate member ISSE and Hon Fellow (relinquished)

Sanitation and Decontamination.

- Certified Mechanical Hygienist, RIA USA
- Member Chartered Institute Environmental Hygiene
- American Indoor Air strategies
- Odour destruction and sanitation INTYG Sweden

Counter Terrorism and Contingency Planning.

- Certified Homeland Security (National Response Teams) USA
- Certified member of Emergency Planning Society Professional Working Group CBRN terrorism UK
- Visiting Lecturer Cranfield Royal military college under Tony Moor

Forensic Investigation.

- Level 1 American College of Forensic Examiners
- Member Institute of American Forensic Examiners

Crime Scene Meth Labs and Cannabis Farms.

- National Institute Decontamination (USA)
- Bio Recovery and Decontamination (UK)

STANDARDS SETTING

2013. Wrote industry Guidelines and Standards for British Damage Management

Association (“BDMA”) "Technical Ref Manual" and the portions of British Standards Institute (“BSI”) PAS 64 guidelines relating to national flood restoration guidelines.

2011 Wrote a presentation to Emergency Planning conference on novel approach to Anthrax (White Powder) event.

2012. Wrote and presented to Emergency Planning conference a desk top exercise on Chemical, Biological, Radiological and Nuclear Centre (“CBRN”) simulation of terrorist attack to shopping Centre in association with HPA Cabinet office and Government Decontamination Service

2007 to 2016 – Assistance in writing various papers for British Standard Institute, BDMA, Insurance Industry Audits for flood restoration.

Responsible for the formation and initial funding and founding chairman of the BDMA, Institute of Inspection Cleaning & Restoration (UK Fire & Flood) and Restoration Industry Association. Actively taken part in committees, debates and presentations.

Previous chairman of BSI Business Continuity Institute London Forum and certified member of Emergency Planning Society CBRNe counter terrorism planning.

Founder of Bio Recovery Decontamination International, Member of BSI standards committee on BS25999 on business continuity.

Recognised expert on CBRN terrorism CEN and technical committee member for European Commission in Brussels etc CWA 16106:2010.

Provided expert support to committees on:

- HVCA Ventilation and indoor air quality. Committee on ductwork sanitation standard TR series
- IICRC S520 mould standard for decontamination and clearance
- BSI PAS 64 Disaster restoration
- BSI Business continuity
- CEN (European Standards) CWA 16106, technical input on protection of EU citizen (600 million) in terrorist CBRN attack
- British Damage Management Association Exam questions and, mission statement.
- BDMA Technical Guidelines and Standards Disaster restoration and recovery (refused but not explained other than my refusal to comply with their requirements that mould is not toxic)

2016 Input to BS12999 and resultant complaint to Secretary of State and HSE with agreement the standard should be re written, leading tom HSE industry investigation 2017

- Qualified in USA in HAZWOPA 40 Hour Health and Safety confined space and CBR decontamination

2018 Wrote and presented a seminar on anthrax and CBR decontamination at MOD Larkhill Garrison for and on behalf of Emergency Planners, CBRN professional working group at Salisbury.

SELECTED INDUSTRY AWARDS

2021 On Line Expert witness of the Year

2013 awarded most prestigious Certified Indoor Environmental Consultant through American Council Accreditation Certification, recognised by US government agencies and UK NHS Aspergillus Centre as most appropriate qualification for mould and IAQ investigation

Won, as lead technician, two UK (CIR) Disaster Recovery of the Year awards 1999-2001; runner up in three other years

In 2013 won two awards with "Security on line emag" CBRN counter terrorism/contingency Trainer of the Year and Disaster Recovery trainer of the year awards.

Won 'Lifetime achievement' award at the prestigious CIR awards and on 'Trainer of the Year' award for 'Counter Terrorism and Contingency' planning in 2013

2015 Contingency Insurance Awards "Innovative product shortlisted 7 CPD training modules on water damage and contamination
2013 Lifetime Achievement industry voted CIR magazine
2013 Security Industry E-Mag Award - CBRN Training and Consultancy Provider of the Year
2010 BANG Innovative Product of the Year Award
2010 CIR Innovative Product of the Year Award
2003 Innovative Product of the Year Award
2002 UK (CIR) Disaster Recovery of the Year Award - shortlisted
2002 UK (CIR) Product Designer CBON Terrorist Attack –Software training product
2002 UK (CIR) Disaster Recovery of the Year Award – Lead Technician – shortlisted
2001 Innovative Product of the Year – CBON Terrorism Building Defence Program
2001 UK (CIR) Disaster Recovery of the Year Award – Lead Technician - winner
1999 UK (CIR) Disaster Recovery of the Year Award – Lead Technician – winner

I have been engaged in worldwide disaster recovery involving flooding, explosion, contamination and fire for over 25 years.
I have attained the highest internationally recognised qualifications as:

- Certified Restorer, **CR**
- Water Loss Specialist (**WLS**
- Certified Mechanical Hygienist **CMH**
- Member of the Chartered Institute of Environmental Health
- Certified Indoor Environmental Consultant through American Council of Accredited Certification (ANSI-ISO) **IEH (**Indoor Environmental Consultant**)**
- Senior Tech and Hon Fellow BDMA in the UK and founding chairman.
- Applied Microbial Restoration Technician IICRC **AMRT**
- Level 1 certification in Infra-red thermography.
- Certified Drone pilot