



National Collaborating Centre  
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# NCCEH Mould Investigation Toolkit

## Reviewing Microbial Investigation Reports

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## Introduction

This document summarizes the type of information that should be included in microbial investigation reports. It is intended to assist Public Health Inspectors and Environmental Health Officers to review and evaluate microbial inspection reports in the course of their normal work duties. While we have taken reasonable measures to ensure the reliability and accuracy of the information presented, the NCCEH and its content providers shall have no liability in relation to the use of information in this document.

Please refer to the NCCEH Mould Assessment in Indoor Environments – Review of Guidelines and Evidence (March 2014) references for a list of guidelines that can be useful in the interpretation of microbial investigation reports.

## Microbial Investigation Reports

### Content Found in All Reports

Microbial investigation reports should contain most or all of the following sections:

#### Executive Summary

A short overview of the project background, objective, scope of work, findings, conclusions, recommendations, and limitations. Additional detail is provided in the report. A summary is typically included for larger reports.

#### List of Abbreviations and Definitions

Reports may include a list of abbreviations and definitions. Alternatively, abbreviations and definitions may be defined inside the report in the main text or as footnotes.

#### Introduction

The introduction in a report includes information on the general purpose of the project (e.g., to conduct an inspection of a building for possible microbial contamination in response to occupant complaints about a musty odour), who conducted the work, where the work was conducted (e.g., building / site / specific area within a building), and when the work was conducted. Important aspects about the building history should also be included (e.g., year of construction, building materials).

#### Background Information

Background information on the reason for the work is normally provided in this section. Information on the driver(s) or motivation for the work being undertaken is normally explained.

In this section an overview of the hazards and risks associated with exposure to microbial contaminants may be provided, commonly through Appendices, depending on the intended audience.

## Objectives

The overall and specific objective(s) of the work being conducted is detailed in this section of the report. This section of the report details what question(s) and/or problems the report is trying to assess or address.

## Scope of Work

The scope of work details the work that was conducted as part of this project. When reviewing this section, it is important to note what activities were conducted as part of the project and what activities were not included as part of the project (e.g., the investigator conducted a visual inspection and moisture testing, but no samples of materials were collected). This information is important to keep in mind when reviewing the conclusions and recommendations. In addition, any assumptions and limitations related to the scope of work should be noted when reviewing this section (e.g., only accessible areas were included in the scope of work). These assumptions and limitations may impact the conclusions and recommendations made later in the report.

## Work Approach

This section in a report is critical to review. It details the approach followed when carrying out the scope of work and may include information on:

- The inspection procedure followed;
- The sampling/monitoring/assessment strategy followed;
- The sampling/monitoring collection methods utilized;
- The analytical methods and laboratories utilized; and
- How the results are to be interpreted.

The work approach section should provide sufficient information for the review to clearly understand what work was undertaken and how the work was undertaken. The information contained in this section should be sufficient to allow another qualified person to read the report and repeat the work if needed.

When reading this section, the reviewer should evaluate if the work approach/methods make sense, if they are technically sound, and if there are any limitations/issues with the work approach.

## Regulations, Standards, and Guidelines

The report should specify any applicable regulations, standards, or guidelines which were important in determining the scope of work, or to which the work product will be compared.

It is important to determine when reviewing this section if the appropriate regulations, standards, and guidelines have been referenced, and that the applicable version has been referenced.

The amount of information provided in this section will vary depending on the intended audience's prior level of knowledge. Reviewers may need to obtain and review the documents

themselves if they are not familiar with the documents, or request assistance from someone more familiar with the documents.

## Results and Discussion

The results section of a report typically presents two types of results:

- Qualitative: Information on site conditions (weather, temperature, wind, etc.), work conditions (e.g., job duties/tasks performed, normal operating day or not, etc.) at the time of the assessment; and walk through inspection findings (e.g., observations, factors that contribute to water infiltration). Sometimes information on the building construction and background information is provided in this section of the report.
- Quantitative: The results of any testing (e.g., moisture meter measurements), monitoring (e.g., relative humidity and temperature measurements), and sampling conducted (e.g., bulk, swab, tape, or air samples).

Summary information is normally presented in this section for larger reports, with more detailed information being provided in the Appendices.

Depending on the author, a discussion of the findings and their meaning relative to the applicable regulations, standards, and guidelines and the objectives of the report is provided. In other cases, the results may be discussed in a separate section.

## Conclusions

The conclusions of the report should summarize the overall findings of the report and what they mean relative to the report objectives and applicable regulations, standards, and guidelines.

When reviewing this section of the report, the reviewer should consider if the conclusions are reasonable given the information known (from historical data and information collected as part of the report being reviewed) and the available regulations, standards, and guidelines.

## Limitations

A discussion of the limitations of the work conducted and/or results should be provided in the report. The limitations may be discussed in a separate section of the report or be included as part of the discussion, conclusions, or recommendations section of the report.

Some typical examples of limitations found in microbial reports include:

- Scope of work limitations;
- Lack of historical information on building or water intrusion events;
- Timing when the work was conducted (e.g., conducted in winter, conducted after hours when relative humidity and temperature may differ compared to during working hours);
- Limited amount of data available (e.g., only a small number of samples were collected due to budget constraints); and

- Data interpretation issues (e.g., lack of, or contradictory, regulations, standards, or guidelines).

### Recommendations

Recommendations, if presented, should be aligned with the conclusions in the report and be geared to addressing the objective(s) of the report. Recommendations, when provided, should be as specific as possible and include a rationale as to why the recommendation is being made.

### Closure

Reports should be signed and indicate who reviewed and approved the report. The credentials of the individuals who prepared and reviewed the report should be detailed somewhere in the report, either in the introduction or closure.

### References

Reports should include a list of references to documents referenced in the report.

### Appendices

The appendices of microbial investigation reports may include:

- Historical reports/documentation related to the report;
- Hazard and risk information;
- Excerpts from regulations, standards, and guidelines or other reference documents;
- Detailed measurement, sampling, and monitoring results;
- Sampling and monitoring collection forms;
- Inspection forms;
- Lab reports;
- Photographs; and
- Definitions and/or abbreviations.

The information contained inside the appendices will depend on the type of report and the size of the report.

## Indoor Air Quality Reports

Indoor air quality assessment may be undertaken to obtain baseline information about the air quality inside the building, to demonstrate compliance with regulations, standards, or guidelines, or in response to an occupant complaint. Depending on the nature of the assessment, an assessment of water intrusion / excess moisture and microbial investigation may or may not be undertaken. If a microbial investigation is included as part of an indoor air quality investigation, it is normally undertaken because there is a history in the building of such issues, or complaints suggest it may be an issue. Indoor air quality assessment reports that address microbial contamination and water intrusion / moisture issues typically contain the following information:

- The locations and extent of any standing water, water staining, evidence of excess moisture;
- The locations and extent of any suspect microbial contamination;
- The presence, description, and location of any musty odours;
- A basic assessment of the ventilation system performance and maintenance;
- The results of relative humidity and temperature monitoring conducted.

In some cases, indoor air quality reports may also contain the results of:

- Moisture meter measurements (often essential);
- Bulk/surface sampling, if performed; and
- Air monitoring for fungal spores, or culturable microorganisms, if performed.

## Microbial Inspection Report

Microbial inspection reports typically contain information on the following:

- A detailed history of the building, water/moisture intrusion events and any remedial action taken;
- A more detailed assessment of the ventilation system performance and maintenance (not always);
- The locations and extent of any standing water, water staining, evidence of excess moisture;
- The locations and extent of any suspect microbial contamination;
- The presence, description, and location of any musty odours;
- The results of moisture meter measurements collected;
- The results of relative humidity and temperature monitoring conducted;
- The results of bulk/surface sampling, if performed; and
- The results of air monitoring for fungal spores, or culturable microorganisms, if performed.

A microbial inspection report includes photographic documentation of the site conditions. In addition, floor plans showing the locations with water intrusion / excess moisture, suspect

microbial growth, and locations where measurements/samples were collected are often included in the appendices of the report.

## Microbial Remediation Report

Microbial remediation closure reports typically contain information on the following:

- History of the water intrusion / elevated moisture levels and microbial contamination issues inside the building;
- The remediation scope of work;
- The remediation methodology (e.g., overview of remediation method and detailed procedures followed for microbial remediation) and monitoring activities undertaken;
- Reference to applicable regulations, standards, and guidelines that will be followed, or referred to during the course of the project;
- Air monitoring results, if collected (before, during, and after the microbial remediation), and an interpretation of what the sample results mean relative to applicable regulations, standards, and guidelines;
- Inspection report from before remediation work starts confirming that the appropriate level of exposure controls is in place and effective and that the contractor conducting the work has all necessary training, documentation, and equipment required to conduct the work;
- Inspection reports during the course of the remediation work detailing the work being undertaken at the time of the inspection, the procedures being followed, confirming the effectiveness of the exposure controls being utilized, additional hidden contaminated materials discovered that need to be addressed, corrective action taken to prevent future water intrusion / excess moisture, and any deficiencies noted requiring correction; and
- Final inspection report following completion of the remediation that confirms contaminated materials were removed appropriately prior to the installation of replacement materials and that corrective actions to prevent further water intrusion / excess moisture were taken.

A microbial remediation report should include photographic documentation of the site conditions prior, during, and after the remediation process in addition to the inspection and monitoring results.