

Occupational hygiene report writing

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ABSTRACT

Occupational hygiene reports record occupational hygiene exposure assessments. Although their purpose and format can vary, they must provide adequate information for managing occupational risks and so ensure the health and safety of employees. This article describes how to write a good occupational hygiene report, specifically with respect to the minimum content and style.

Key words: occupational hygiene report, content, standards

INTRODUCTION

The findings of occupational hygiene exposure assessments are recorded in occupational hygiene reports. The purpose of these reports can vary, for example providing communication to management, employees, health and safety representatives, engineers, etc. regarding occupational hazards present in the workplace, addressing emergencies and, importantly, provide practical exposure control advice and, are critical in managing occupational risks.¹ Although several formats for the reports exist, they should all serve to support the major purpose of the measurements, that is, to ensure the health and safety of employees.¹ To this end, they should be easily accessible to all employees, management and inspectors. It is also essential to ensure that appropriate systems exist to ensure that the findings of occupational hygiene surveys are reported in a logical and understandable way to management, the occupational medical practitioner and other relevant persons.¹ Management will only be able to take appropriate preventive and/or corrective action if provided with sufficient information.¹ This article describes how to write a good occupational hygiene report, specifically with respect to the minimum content and style. Apart from being of value to the authors of such reports, it should assist those commissioning them so that they are able to determine their quality and usefulness.

For the purposes of this article, "report" refers to an occupational hygiene report written by occupational hygiene professionals describing the findings during an exposure assessment and/or audit.

The importance of a sound, well written report cannot be overemphasised. Reports, once signed, become a legal document in many cases and are a direct reflection on the person/s compiling the report and their abilities. A report therefore needs to be scientifically sound and grammatically correct.

Various standards make reference to report contents however no specific standard deals with the minimum contents of an occupational hygiene report. The impact of changes in standards frequently used by hygienists is discussed and advice for hygienists is given on how to accommodate the changes and follow best practice guidelines for report writing.

CONTENT OF THE REPORT

Firstly, a decision needs to be taken as to who will be the recipient of the report. This decision will be based on the scope of work and the mandate provided by the client.

When the target audience is the senior management of an organisation, the report needs to be concise and preferably no longer than one page with the technical and other information contained in an appendix. A popularly recounted anecdote is that the average reading ability of a company's chief executive officer is equitable to that of a 14-year-old, the reason being that they are burdened with massive amounts of data that must be digested on a daily basis. This report can typically be a summary of findings as described in the detailed occupational hygiene report.

A well-known document referred to by occupational hygiene professionals is a publication by the South African Bureau of Standards (SABS) 0259:1990 with the title: General requirements for the competence of calibration and testing laboratories.² This document² provides minimum requirements for reports issued by laboratories and includes the minimum content that needed to be addressed in occupational hygiene reports. These are summarised below:

- "a title, e.g. Calibration Certificate, Test Report or Test Certificate";
- "name and address of laboratory, and location where the calibration or test was carried out, when different from the address of the laboratory";
- "unique identification of the certificate or report (such as serial number) and of each page, and the total number of pages";
- "name and address of client, where appropriate";
- "description and unambiguous identification of the item calibrated or tested";
- "characterisation and condition of the calibration or test item";
- "date of receipt of calibration or test item and date(s) of performance of calibration or test, where appropriate";
- "identification of the calibration or test method used, or unambiguous description of any non-standard method used";
- "reference to sampling procedure, where relevant";
- "any deviations, additions to or exclusions from the calibration or test method, and any other information relevant to a specific calibration or test, such as environmental conditions";
- "measurements, examinations and derived results, supported by tables, graphs, sketches and photographs, as appropriate, and any failures identified";
- "a statement of the estimated uncertainty of the calibration or test result (where relevant)";
- "a signature and title, or an equivalent identification of

- person(s) accepting responsibility for the content of the certificate or report (however produced), and date of issue”;
- “where relevant, a statement to the effect that the results relate only to the items calibrated or tested”;
 - “a statement that the certificate or report shall not be reproduced except in full without the written approval of the laboratory”;
 - “where relevant, a statement regarding the traceability of measurement”.

This standard has been withdrawn and replaced by SANS 10378:2005 – General requirements for the competence of verification laboratories in terms of the Trade Metrology Act.³ This standard is also applicable to the verification laboratory environment and says the following about the reporting of results³:

General

“The results of each verification procedure carried out by the laboratory shall be reported accurately, clearly, unambiguously and objectively, and in accordance with any specific instructions in the verification methods.

- responsible for the verification, date of verification and a seal number used for identification of the responsible verification officer and the accredited laboratory”; and
- “the following statement: “The instrument(s) was/were tested and found to comply in all respects with the requirements of the Trade Metrology Act, 1973 (Act No. 77 of 1973) and may be used for a prescribed purpose as intended by the Act.” ”

Reporting of results

“For every verification the following shall be documented as a minimum for the interpretation of test results”:

- “reference to the applicable verification – or rejection certificate”;
- “verification status (new, repaired or in actual use) of the instrument immediately prior to verification”;
- “observations made during the preliminary examination may be combined in a single statement, however, any non-complying aspect needs to be separately indicated”;
- “all results of tests where an error limit is prescribed, including the true value at which the specific tests were done,

“Management will only be able to take appropriate preventive and/or corrective action if provided with sufficient information.”

The results shall be reported, normally in a test report or a verification certificate and shall include all the information that is requested by the client and is necessary for the interpretation of the test or verification results and all information required by the method used”.

Verification certificates

“Each verification certificate shall include at least the following information, unless the laboratory has valid reasons for not doing so”:

- “the title “Verification Certificate””;
- “name and address of the verification laboratory”;
- “unique identification of the verification certificate (such as a serial number), and on each page, an identifier that will ensure that the page is recognized as a part of the verification certificate, and a clear identifier of the end of the verification certificate”;
- “name and address of the client”;
- “identification of the verification method used”;
- “description and unambiguous identification of the items verified”;
- “statement which will serve as proof that the equipment used is traceable to the national standard. The following data shall be included as a minimum”:
- “calibration certificate number”;
- “date of calibration of equipment”;
- “identification of equipment e.g. serial numbers, description, set number etc.”; and
- “own or loan equipment”.
- “expiry date of the verification certificate, if applicable”;
- “the name and signature of the verification officer

that are to be within the prescribed limits of error, shall be recorded. This includes the permissible or applicable errors”;

- “deviations, additions to, or exclusions from the test method, and specific test conditions, such as environmental conditions”;
- “when the instrument being verified has been adjusted or repaired, the results before and after adjustment or repair, if requested by the client, may be reported in the form of an additional test report”;
- “name and seal identification of the responsible verification officer; and
- date of testing”.

Electronic transmission of results

“In the case of transmission of verification results by facsimile or other electronic or electromagnetic means, the requirements of this standard shall be met”.

Format of reports and certificates

“The format shall be designed to accommodate each type of verification carried out and to minimise the possibility of misunderstanding or misuse”.

“Attention should be given to the lay-out of the verification certificate, especially with regard to the presentation of the verification data and ease of assimilation by the reader. The headings should be standardised as far as possible”.

From the above standards, it is clear that some standard should be followed by the occupational hygienist in compiling

reports. Although they can be used as a guideline, given the drive for the accreditation of Approved Inspection Authorities (AIAs) it is important to take into account the perspective of SANS 17020:1998 – General criteria for the operation of various types of bodies performing inspection.⁴ The following is mentioned in this standard (reference)⁴:

Inspection reports and inspection certificates

- “The work carried out by the inspection body shall be covered by a retrievable inspection report and/or inspection certificate”.
- “The inspection report and/or inspection certificate shall include all the results of examinations and the determination of conformity made from these results as well as all information needed to understand and interpret them. All this information shall be reported correctly, accurately, and clearly. Where the inspection report or inspection certificate contains results supplied by subcontractors, these results shall be clearly identified”.
- “Inspection reports and inspection certificates shall be signed or otherwise approved by authorized staff members only”.
- “Corrections or additions to an inspection report or inspection certificate after issue shall be recorded and justified in accordance with the relevant requirements of this section”.

None of the mentioned standards relate specifically to occupational hygiene reporting. The Hazardous Chemical Substances Regulations of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) for example, specifically calls for AIAs or persons verified by AIAs to carry out measurements.⁵ For this reason, persons verifying reports requiring AIA expertise need to be duly authorised by the AIA to sign reports and at least be registered on the occupational hygienist level with the Southern African Institute for Occupational Hygiene (SAIOH). It is recommended that the compiler of the report, if a different person to the duly authorised person, sign the report as such.

Table 1 recommends the basic content that needs to be included in any AIA occupational hygiene report.¹

Table 2 contains a checklist which can be used to evaluate an occupational hygiene report. An extensive survey report should obtain a “yes” answer for many of the points.¹ On completion of the draft report, it should be evaluated for content, spelling and grammar and then peer reviewed. Once this has been done, the client should be provided with an original, signed document either by hand or registered mail. If electronically submitted, ensure that the report is digitally signed and authenticated by using software such as Adobe or similar software. Always ensure client confidentiality and never allow spare copies of reports to remain uncontrolled as results may be of a sensitive nature.

Table 1. Fundamental content to be included in any occupational hygiene report (Adapted from Badenhorst et al¹)

<p>1. TITLE PAGE</p> <p>Name of company. Physical address. Date. Title, e.g. Noise Evaluation Report. Unique number of report. Surveyor’s name and signature. If AIA – Name of AIA or name of person who verified the report.</p> <p>2. EXECUTIVE SUMMARY</p> <p>3. CONTENT PAGE</p> <p>4. INTRODUCTION</p> <p>Who did the survey / investigation? Why was it done (including purpose of survey / investigation)? Who initiated the survey / investigation? Where it was done. The date(s) on which it was performed. Limitations of the survey (e.g., other exposures not measured). Outcome of the survey / investigation (in short).</p> <p>5. METHOD</p> <p>Describe or reference the methods / procedures used, including any legal aspects. Detail of the instrument(s) (perhaps copies of calibration certificates) used.</p>	<p>6. RESULTS</p> <p>Indicate the results; include plans to indicate sampling / measurement positions. Indicate those areas / positions where problems occur. Include tables, figures, histograms or other methods of displaying results.</p> <p>7. DISCUSSIONS / REMARKS</p> <p>Interpretation of results / other studies / effects.</p> <p>8. RECOMMENDATIONS</p> <p>State control measures, include diagrams of control measures / techniques and monitoring strategies.</p> <p>9. REFERENCES</p> <p>10. APPENDIX</p> <p>Plan(s) and Figures (diagrams). Tables. Calibration certificates. AIA certificate. Standard method(s). Legislation.</p> <p>11. GENERAL</p> <p>Number of pages [page 3 of 25]. The occupational hygienist should sign each page. Quality control: Name and signature.</p> <p>Keep it simple and technical: Explain terminologies.</p>
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Table 2. Checklist for an occupational hygiene report (Adapted from Badenhorst et al¹)

Report title	Yes	No
Does the title accurately describe the contents of the report?		
Is the title specific enough (i.e. give enough information)?		
Is the title concise enough (i.e. not give too much information)?		
Does the title enable easy electronic and manual filing and indexing?		
Executive summary/Summary		
Is it one page, or shorter, in length?		
Does it contain a statement of the problem?		
Does it contain information on who was monitored and where?		
Does it contain a statement of the methods used?		
Does it contain the most important results relative to the applicable OELs?		
Does it contain a statement of the conclusion(s) if found to be necessary?		
Does it contain the essential recommendations?		
Introduction		
Is the problem clearly stated?		
Is the rationale for the survey work included?		
Is the history/background included, and in sufficient detail?		
Does it reflect who did it, where and how it was done, and what workers were monitored?		
Does it include a summary of the operations and or processes conducted during the survey?		
Materials and methods		
Are materials and equipment described in sufficient detail for repetition, if necessary?		
Are methods described in sufficient detail for repetition, if necessary?		
If a laboratory manual was used as a reference, was it paraphrased and properly cited?		
Is the laboratory utilised identified?		
Are methods of statistical analysis included here?		
Is this section free of results or discussion?		
Results		
Have all the results been described in the text of the results section?		
Have only the most relevant data been selected and reported in the tables and figures?		
Have all the figures and tables been cited in the text of the results section?		
Have the most effective graphical or tabular formats been chosen to present important data?		
Can all figures and tables be understood without having to refer to the text?		
Are figures properly titled and captioned (below figure)?		
Are tables properly titled and captioned (above table)?		
Where applicable, does the dependent variable appear on the vertical axis and the independent variable on the horizontal axis?		
Are tables and figures numbered independently, and are they numbered according to the sequence in which they are cited in the text?		
Have appropriate statistics been reported, and are they correct?		
Is the results section free of methodology or interpretation?		
Is the results section well organised?		
Discussion		
Have all possible conclusions been drawn from the data, i.e. have all the data's repercussions been discussed?		
Where applicable, have anomalies been reported and addressed?		

Discussion (continued)	Yes	No
Have assumptions been identified and justified?		
Where applicable, has the relationship between these and previous findings been discussed?		
What could the non-compliance result in from a legal and health point of view?		
Are control measures, and the efficiency of these control measures and any deficiencies in control measures discussed in this section?		
Is compliance with legal requirements highlighted in this section?		
Is the discussion section well organised?		
Recommendations		
Are preventive measures included if employee exposures require to be reduced?		
Are required monitoring strategies and programmes or additional required measurements listed?		
Are required actions to improve preventive measures and the persons responsible for carrying them out recorded along with action dates?		
Is the recommendations section well organised?		
Acknowledgements		
Where applicable, are persons who assisted with the survey work identified?		
Are sources of borrowed equipment and supplies identified?		
Where applicable, are contributors of donated services (i.e. reviewing and editing) identified?		
Literature cited		
Do all references cited appear in the text?		
Are all citations consistently presented in the same format?		
Are citations presented in an established format, including internet citations?		
General		
Is the report consistently written in the past tense?		
Have typing errors and misspellings been eliminated?		
Does the entire report exhibit stylistic consistency?		
Did the authors use citations rather than footnotes?		
Does the report include a table of contents?		
Does the report need a listing of tables and figures?		
Does the report need a list of abbreviations and acronyms or a glossary?		
Does the report have provision for the official review or signing off by the relevant person(s)?		

CONCLUSION AND RECOMMENDATIONS

Occupational hygiene reports are ultimately intended to be used to ensure the health and safety of employees. It is important to remember that a report may become a legal document and can be used as evidence in a court of law. For this reason, occupational hygiene professionals should document information in such a way that it will be easy to refresh their memories should a case be brought to trial years after the report has been issued.

Currently no specific standard for the writing of occupational hygiene reports exists. Existing SANS standards do not fully address this issue. The occupational hygiene community is in need of a standard that comprehensively covers the requirements of an occupational hygiene report.

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