

books

Guidelines for drinking-water quality, Volume 1: Recommendations, third edition

WHO, 2004, 366 pages, ISBN 92 4 154638 7, US\$ 63.00, or download a free copy from the WHO website: (http://www.who.int/water_sanitation_health/dwq/en)

'Set health-based targets, undertake a hazard assessment and risk characterization for the whole water-supply system, monitor and control operation at critical points, document clear management plans and communication strategies for normal and incident conditions, and (independently) verify that the system as a whole is operating safely'.

In a nutshell, this is the framework for safe drinking water, outlined in chapters 3–5 of this third edition of the WHO *Guidelines for drinking-water quality*. Following this approach should ensure the safety of drinking-water supplies through the control of risks posed by microbial, chemical and radiological hazards.

Controlling water quality according to the framework outlined in the *Guidelines* becomes an issue of risk management, where system inputs and performance are monitored from source to tap, instead of the usual approach of monitoring system output by complying with quantitative water-quality targets. In the *Guidelines*, the systematic assessment of risk and risk-management approaches are termed water-safety plans (WSPs). These are inspired by the hazard analysis and

critical control points (HACCP) approach widely used in the food industry. Generic water-safety plans (including for point sources) are included in the accompanying publication on the subject of WSPs.

The nine remaining chapters of the *Guidelines* provide supporting information for this central theme of risk management. Institutional roles at different levels are described, as are the requirements for a framework for safe drinking water. Extensive information is provided on microbial and chemical aspects of water quality, including summary statements for specific pathogens and individual chemical hazards of actual or potential concern. This third edition also includes more information on application of the *Guidelines* in specific circumstances (e.g. small community supplies, in large buildings, in emergencies and disasters) and to specific applications (e.g. bottled water, water in food production, etc.). Finally, this revised volume 1 lists a series of publications that substantiate or explain the content of the *Guidelines*, and provide guidance on 'good practice' in achieving drinking-water safety.

So what are some of the practical implications of the new approach? The emphasis remains on ensuring microbial quality, but with better verification of final results. The extensive use of sanitary inspections is encouraged for operational monitoring and verification purposes. The usual practice for microbial quality determination in community supplies (measuring *E. coli*, chlorine, turbidity and pH) is suggested as a surveillance tool. The *Guidelines* acknowledge that, in the case of community-managed supplies, frequent sampling is unlikely, and propose a rolling programme of visits to ensure that each supply is visited once every 3–5 years. New to the *Guidelines* is the suggested frequent use of presence/absence tests for faecal indicator bacteria, and the use of additional indicators (intestinal enterococci, *Clostridium perfringens*, bacteriophages) in specific circumstances. There has been increasing recognition that only a few key chemicals cause large-scale health effects (e.g. fluoride, arsenic), and the (infrequent) determination of known problem chemicals is part of assessment and surveillance.

Following the new *Guidelines* will almost certainly mean a different approach to work for those responsible for carrying out monitoring and surveillance tasks. Training in risk assessment and control may be required, and in certain cases new equipment or procedures for microbial assessment may be needed. Adopting the new *Guidelines* will thus have resource implications.

The third edition of the *Guidelines* builds on concepts and information used

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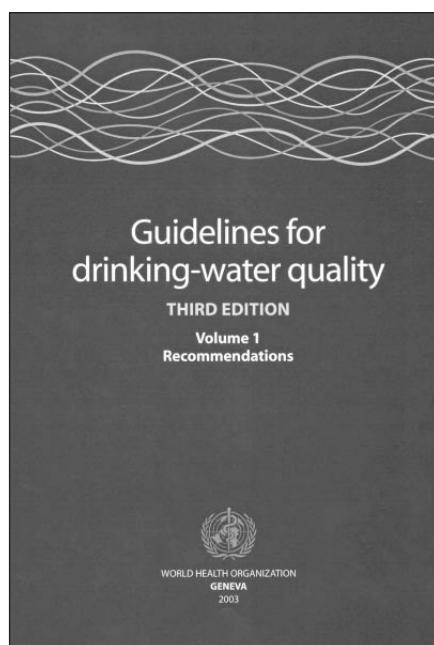
in previous editions, but it represents a major overhaul, not just an 'incremental upgrade'. Concepts are explained at various levels of complexity, which leads to some repetition, and a few seeming inconsistencies. However, those are minor quibbles for what is by any standard an exhaustive reference. The many supporting documents (23 are listed as available or in preparation) provide access to a great deal of practical information, further enhancing overall usefulness.

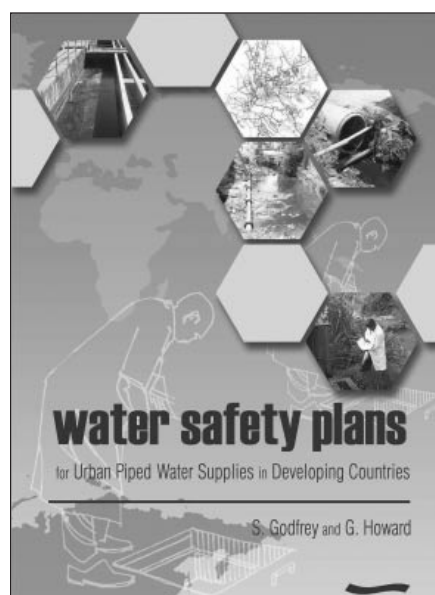
Actual use of the *Guidelines* will depend on how well the publication is disseminated; the fact that they – and many of the supporting documents – can be downloaded for free from the WHO website is a step in the right direction. However, since not all of us are blessed with the required IT infrastructure, it is to be hoped that WHO will publish a low-cost print edition, perhaps combined with some of the supporting publications of most relevance to community-managed supplies in developing countries (water-safety plans, assessing microbial safety, domestic water quantity, service level and health to name a few). Another format is the third edition of the WHO *Water, Sanitation and Health Electronic Library*, which is on CD and includes the second and third edition of the *Guidelines*, as well as many of the supporting documents (available at phedoc@who.int, for US\$351 or \$81 for developing countries).

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Water safety plans for urban piped-water supplies in developing countries

Sam Godfrey and Guy Howard
2004, WEDC, Loughborough University, 104 pages, plus CD with more details of case studies. Can be downloaded from www.lboro.ac.uk/watermark/WEJX7/WSP%20book%20021104.pdf





The guidelines in this book are designed to enable practitioners involved in supplying piped urban water supplies to develop their WSPs and thus manage effectively the risk to quality of the water that they supply. Following brief coverage of the background to WSPs (covered in more detail in an associated document 'Overview to improved risk assessment and management of piped urban-water supplies'), the authors provide guidance on an important preliminary step in the development of WSPs – obtaining the commitment of managers and operational staff. This is in fact a key component of the plan and may, in fact, be the hardest step to achieve. The main sections of the guidelines describe the six stages required to develop a WSP: forming the WSP steering team; system description and analysis; tools development and pilot activities; system assessment; developing the WSP; and verification by water quality analysis. Finally, there is a section on using the WSP, which includes aspects such as communication, monitoring and verification plans, and a brief conclusion.

The text combines the principles behind a stepwise approach to the development of WSPs with practical illustrations of methods and tools that were used in three schemes where the approach has been implemented, namely Kampala and Jinja in Uganda, and Guntur in Andhra Pradesh, India. There are numerous figures showing flow diagrams for each step in WSP development and associated boxes with illustrative data from the three case-study water supplies. This is a successful format, allowing the reader to understand how the WSP is developed in theory and also in practice, thus providing them with the knowledge and skills necessary to apply the approach themselves.

The guidelines stress the need for an interdisciplinary team to manage the

development (and implementation) of the WSP and provide evidence for different approaches/time frames in WSP development. They also allow for the constraints often encountered in developing countries (financial, data shortages or reliability and logistical). Once the decision to adopt this approach to risk management has been taken by a supplier then the step-by-step approach described should enable successful development and implementation of a WSP.

The book is well referenced and is supported by a CD giving more details on the three case-study supplies.

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Handbook of Water and Wastewater Microbiology

Duncan Mara and Nigel Horan (editors), 2003, Academic Press, ISBN 0 12 470100 0, £85.99

This book is orientated towards microbiologists and public health engineers working in the sectors of water supply and wastewater management. The concept for the book is based on the premise that engineers generally do not fully appreciate the importance of microbiological processes in water and wastewater systems, whereas microbiologists tend to have a fairly limited understanding about how these systems operate from an engineering perspective. Bridging this knowledge gap is considered critical as micro-organisms are responsible for a wide range of diseases as well as for the processes adopted in environmental engineering for the biological treatment of wastewater.

This publication brings together probably just about everything you need to know about all facets of microbiology related to water supply, sanitation and wastewater management. The amount of information contained within the book and the diversity of subjects is fairly overwhelming. Consisting of over 800 pages and weighing in at 2 kg, the book would more accurately be described as a tome and you will need to reserve space on your sturdiest bookshelf to house this 'handbook'.

In addition to the sheer size of the book, it is impressive in other respects too. Seventy-five of the world's leading specialists in the world of microbiology – the majority of these being academics, but also consultants and representatives from international development agencies such as the World Health Organization – have contributed a total of 42 chapters divided into four parts. Starting with an introductory chapter focusing on basic

microbiological principles related to microbial nutrition and metabolism, the book develops these principles over a further 41 chapters, covering a very wide range of highly focused issues relating to water and excreta-related diseases, wastewater treatment and drinking-water quality.

The first part of the book also provides details of the microbes (viruses, bacteria, protozoa, filamentous fungi) of sanitary importance, the detection and enumeration of faecal indicator organisms and other micro-organisms of public health significance. The second part of the book focuses on the links between different micro-organisms, types of disease, health impacts and their transmission routes. It includes chapters on communicable diseases and emerging waterborne pathogens, risk assessments for waterborne microbial contamination and standards for various types of water use – drinking water, wastewater reuse and discharge.

The third part of the book focuses on aspects of the microbiology of wastewater treatment and covers a large proportion of the book, which is subdivided into a further three sections providing details of various types of fixed-film processes and their application, the behaviour of pathogens (bacteria and viruses) in wastewater treatment processes, and a discussion of the problems related to microbiology in these treatment processes. The final part of the book covers microbiology related to drinking-water quality in treatment and distribution systems, including chapters on rainwater collection and storage, biofilms in water distribution systems, taste and odour problems, as well as a discussion about specific problematic microbes such as *Giardia* and *Cryptosporidium*.

In the space of a short book review, it is hard to do justice to the monumental scale of the book and the work that went into its preparation. Although the book is dense and it is not a general practitioner's manual, the information contained within the chapters has considerable practical application for engineers who are responsible for the design and operation of water supply and wastewater systems and who want to gain an improved understanding of both basic and more advanced issues related to microbiological processes. It is normal to suggest areas in which a publication could (or should) be improved. Apart from a reduction in the rather weighty price tag of £85.99, I find it hard to think of ways to improve this publication. A big round of applause to the editors and to all those who contributed.

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