GLOBAL WATER RESEARCH COALITION

WATER QUALITY RESEARCH AUSTRALIA

Global Water Research Coalition

INTERNATIONAL GUIDANCE MANUAL FOR THE MANAGEMENT OF TOXIC CYANOBACTERIA

International Guidance Manual for the Management of Toxic Cyanobacteria

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GLOBAL WATER RESEARCH COALITION

The Global Water Research Coalition (GWRC) is a non-profit organisation that serves as a collaborative mechanism for water research. The benefits that the GWRC offers its members are water research information and knowledge. The Coalition focuses on water supply and wastewater issues and renewable water resources: the urban water cycle. GWRC was officially formed in April 2002 with the signing of a partnership agreement and a partnership agreement was signed with the U.S. Environmental Protection Agency in July 2003. GWRC is affiliated with the International Water Association (IWA).

The members of the GWRC are:

- Anjou Recherche – Water Operations Research Center of Veolia Water (France)
- EAWAG – Swiss Federal Institute for Aquatic Science and Technology
- KWR – Watercycle Research Institute (Netherlands)
- PUB – National Water Agency of Singapore
- SUEZ Environmental – CIRSEE – International Research Center on Water and Environment (France)
- Stowa – Foundation for Applied Water Management Research (Netherlands);
- TZW - Water Technology Center of the German Waterworks Association
- UKWIR - UK Water Industry Research
- Water Environment Research Foundation (USA)
- WQRA - Water Quality Research Australia
- WRC - Water Research Commission (South Africa)
- Water Research Foundation (USA)
- WateReuse Foundation (USA)
- WSAA - Water Services Association of Australia

These organisations have national research programs addressing different parts of the water cycle. They provide the impetus, credibility, and funding for the GWRC. Each member brings a unique set of skills and knowledge to the Coalition. Through its member organisations GWRC represents the interests and needs of 500 million consumers.

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PREFACE

Cyanobacteria, also known as blue-green algae, are a primitive group of organisms which, according to fossil records, have existed for approximately 3.5 billion years. Cyanobacteria have evolved to allow the efficient utilisation of many environments, including marine and freshwater sources.

Cyanobacteria are a concern for water authorities worldwide as their persistence in water supplies causes numerous problems for water treatment plants. However, the major concern associated with the presence of cyanobacteria is the metabolites they produce, taste and odour compounds, particularly 2-methyl isoborneol and geosmin, and a range of toxic compounds known collectively as algal toxins, or cyanotoxins. The first recorded stock death due to the presence of cyanobacteria was reported in South Australia in 1878, and since that time cyanotoxins in drinking water have been implicated in a range of adverse health effects on the communities receiving contaminated water. As a result, the management of cyanobacteria, in source water and by treatment, has been an ongoing focus of water industry research and over several decades hundreds of journal articles, reports and fact sheets have been published on these topics. Several years ago, a research project was developed through the Cooperative Research Centre for Water Quality and Treatment to consolidate that wealth of knowledge into a practical, user-friendly manual that could be used by Australian water quality managers and operators to help manage cyanobacteria in source waters. During the following years, manuals with similar aims were developed in South Africa and Europe.

The management of cyanobacteria and cyanotoxins is one of the priority issues in the research agenda of the Global Water Research Coalition. In 2007 a GWRC expert workshop was held in South Africa, attended by those responsible for the development of the three regional manuals, with the aim to consolidate the available knowledge and know-how and to develop an international guidance manual incorporating the most important aspects of the different manuals to enable its application worldwide.

SCOPE OF THE GUIDANCE MANUAL

The international manual covers information required to:

- understand the importance of cyanobacteria and the toxins they produce
- assess the risks associated with a particular water source
- develop a monitoring program and incident management strategies consistent with the WHO Water Safety Planning process

- instigate management procedures both in the source water and treatment plants to mitigate the risks posed by the presence of toxic compounds in drinking water.

The manual is a user friendly document that can be accessed on several levels, from basic information for the water quality manager who knows very little about cyanobacteria, to those requiring more detailed guidance on, for example, source water management methods, or doses of activated carbon required to reduce toxin concentration to below the WHO guideline. It is hoped this manual will be accessed by water utilities world-wide, and feedback on its application will be used to update and implement revisions to maintain and enhance its usefulness to the international water industry.

HOW TO USE THE MANUAL

The manual has been developed to cover several levels of knowledge. Level 1 is designed to be read as a basic text to help the water manager, or any interested community member, understand the issues surrounding cyanobacteria and the reasoning behind various monitoring and management practices. This level can be downloaded from this package and printed as a stand-alone document if desired (Guidance Manual Level 1, left menu). The entire manual can be found in this package as seven separate chapters (left menu). In each of these chapters there are either two or three levels of information; Levels 2 and 3 are accessed through links in Level 1. Level 2 adds additional details to the basic information in Level 1, in some cases engineering aspects, some more fundamental information, or in Chapter 6 for example, specific details required to implement an alert levels framework as part of an overall cyanobacteria incident management plan. Chapter 3 has a third level, with more detailed information on analytical procedures.

It is hoped that the level of information present in the guide will be appropriate for most readers wishing to learn more about such an important topic.

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