

DRINKING WATER REGULATION AND HEALTH

FREDERICK W. PONTIUS, P.E.

Pontius Water Consultants, Inc., Lakewood, Colorado

 **WILEY-
INTERSCIENCE**

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PREFACE

Drinking water engineers and scientists generally receive extensive academic training in math, science, engineering, and technical subjects needed to pursue their chosen profession. In most cases, little formal training (and even then only a lecture or two) is provided on legislative and regulatory procedure and current issues prior to entering the workforce. By and large young (and old) professionals are essentially spoon fed, expected to accept what they are told by whatever a particular industry or lobbying group, professor or instructor, or agency they prefer or are compelled to believe. Few are able to take the time to understand and consider the issues discussed in this volume and draw thoughtful conclusions on their own, and if they do, many do not know where to begin. Such was the case for me as a young engineer.

In the early 1980s, I attended my first meeting of the American Water Works Association (AWWA) Water Quality Division. There, Trustee Alan A. Stevens, then a USEPA research scientist (now retired), announced that a new drinking water regulation had just been issued, and then proceeded to hold up a copy of the *Federal Register* notice. What's that? I asked. A few years later, at a national conference I sensed the excitement of many (and the disappointment of others) over the enactment of amendments to the Safe Drinking Water Act (SDWA) the day before. But lobbyists only knew the content of the new law, except for those who knew exactly where to look. [The Internet would not come into common use until well over a decade later.]

The water industry's need for a common sense understanding of regulatory and legislative procedure and issues was demonstrated to me in a series of events in the early 1990s. A paper I had written, "Complying with the New Drinking Water Quality Regulations," was published in the February 1990 issue of *Journal of the American Water Works Association*, and won the 1990 AWWA Publications Award. Soon thereafter, Nancy Zeilig, then editor of the *Journal AWWA*, agreed to publish on a trial basis a monthly column on legislative and regulatory issues, known as Leg/Reg. The first article appeared in July 1990, "Surface Water Treatment Regulations." In addition, I began preparing an annual review article on drinking water regulations, also published in the *Journal AWWA*. These articles became very popular after only a short period of time (several won Best Paper Awards), and they soon took on a life of their own. The Leg/Reg column was published monthly for

over 10 years. With the support of Marcia Lacey, current editor of the *Journal AWWA*, the annual reviews are still published (as of 2003), although the nature of such reviews has changed each year given the flood of regulatory and legislative information now available on the Internet.

Since the mid-1990s, use of the Internet has grown tremendously, especially within the water industry. Legislative and regulatory information is now more widely available than ever before. Unfortunately, this has resulted in a different problem—information overload. It is easy now to find information on regulatory and legislative matters. But it can be more difficult now to follow and understand the thinking, developmental work, and politics behind them. Indeed, federal and state regulators, as well as water utilities and consultants, spend most of their time and effort just keeping up with what requirements they must meet, let alone having time to fully understand the technical and policy basis behind them.

This particular volume was developed to fill the current need for a professional reference text for water utilities, consultants, and regulators, regarding the regulation of drinking water in the United States. Basic principles are presented concerning the SDWA and drinking water regulation. It is not intended to be a detailed compliance guide to every regulation—nor does it cover the blow-by-blow of current political lobbying activities. Chapter authors for this first edition were intentionally selected from a cross-section of different agencies and organizations. In preparing their chapter, the author(s) worked independently to present the state of the knowledge in their subject area. Each chapter was peer reviewed prior to publication. By focusing only on certain foundational issues, this volume will hopefully provide for many the understanding they need to more effectively participate in the legislative and regulatory process, better determine what regulatory actions and activities are relevant to their water utility or agency, and thereby make better legislative and regulatory compliance decisions.

Supplemented with additional reading and problem sets, this volume is also appropriate as a text for classroom use, either in undergraduate or graduate environmental engineering programs. By understanding the history and basic principles associated with drinking water legislation and regulation, and confronting current issues early in their career, students will be better prepared as they enter the workforce. In particular, professionals in the field who will spend at least some portion (and in some cases all) of their career working for a regulatory agency will benefit the most from early exposure to legislative and regulatory procedures and issues.

Since enactment of the SDWA in 1974, great progress has been made in drinking water quality and regulation in the United States. It seems now that only the most difficult issues remain—protecting sensitive populations, achieving sustainable water systems, providing affordable drinking water for small systems, avoiding risk–risk tradeoffs, and controlling emerging waterborne pathogens, to name only a few. The need for creative thinking and innovation in drinking water regulation and legislation has never been greater. To that end, this volume is dedicated.

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ACRONYMS

AA	Activated alumina
AF	Attributable fraction
AIDS	Acquired immune deficiency syndrome
AMCL	Alternative maximum contaminant level
ANSI	American National Standards Institute
ANPRM	Advance Notice of Proposed Rulemaking
AOP	Advanced oxidation process
APA	Administrative Procedure Act
AR	Attributable risk
ARPA	Advanced Research Projects Agency
ASDWA	Association of State Drinking Water Administrators
ATSDR	Agency for Toxic Substances Diseases Registry
AWWA	American Water Works Association
AWWARF	AWWA Research Foundation
AX	Anion exchange
B–C	Benefit–cost ratio
BAT	Best available technology
BCA	Benefit–cost analysis
BMD	Benchmark dose
BOM	Biodegradable organic matter
BT	Benefits transfer
BTWC	Biological and Toxins Weapons Convention
CA	Cellulose acetate
CCC	Chlorine Chemistry Council

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CCE	Carbon chloroform extract
CCL	Contaminant Candidate List
CCR	Consumer Confidence Report
CDC	Centers for Disease Control and Prevention
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CI	Confidence interval
COI	Cost of illness
CPE	Comprehensive performance evaluation
CT	Disinfectant residual concentration (<i>C</i>) in milligrams per liter (mg/L) multiplied by the disinfectant contact time (<i>T</i>) in minutes
CWA	Clean Water Act
CWC	Chemical Warfare Convention
CWS	Community water system
CWSRF	Clean Water State Revolving Loan Fund
CWSS	Community Water Supply Study
DBO	Design, build, and operate
DBP	Disinfection byproduct
DBPR	Disinfection Byproducts Rule
DENR	Department of Environment and Natural Resources (South Dakota)
DEP	Department of the Environment
DFO	Designated Federal Official
DHS	Department of Health Services
DNA	Deoxyribonucleic acid
DWC	Drinking Water Committee
DWCCL	Drinking Water Contaminant Candidate List
DWEL	Drinking water equivalent level
DWPL	Drinking Water Priority List
DWSRF	Drinking Water State Revolving Loan Fund
EBCT	Empty-bed contact time
EDE	Effective dose equivalent
EDF	Environmental Defense Fund
EDR	Electrodialysis reversal
EEAC	Environmental Economics Advisory Committee
EJ	Environmental justice
ELI	Environmental Law Institute (Washington, DC)
EO	Executive Order
ETV	Environmental Technology Verification
FACA	Federal Advisory Committee Act
FAS	Federation of American Scientists
FBRR	Filter Backwash Recycling Rule
FGR	Federal Guidance Report