

PRACTICAL  
ENVIRONMENTAL  
FORENSICS



# **PRACTICAL ENVIRONMENTAL FORENSICS**

**Process and Case Histories**

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# Preface

This book addresses the comprehensive environmental forensic process. It is not based solely on chemical and investigative methods that are used as forensic tools, although these tools are presented within the text and also illustrated within the context of environmental forensic case histories. The primary goal of this book is not only to help engineering and scientific professionals understand the forensic process as it pertains to environmental problems, but also to assist any potential expert (e.g., experts involved with construction, intellectual property, patents, medicine, product liability or personal injury litigation) in gaining a “common insight” into the forensic process. A secondary goal is to provide both technical professionals and attorneys an in-depth treatise on both environmental law and engineering/scientific issues commonly encountered in environmental cases.

Practical Environmental Forensics has an immediate application for engineering and scientific professionals who currently provide or anticipate providing expert opinions or environmental litigation consulting services, as well as attorneys practicing in the environmental field. The case history chapters present not only “real-world” examples of environmental cases, but also “illustrative problem solving” as a teaching resource for use in graduate-level engineering/environmental courses.

As a result of the authors’ combined 50-plus years of experience in basic research, teaching, and consulting—as well as more than 30 years of environmental litigation experience—this book leans heavily upon knowledge gained from the review of historic industrial and commercial business practices as contrasted with the published literature. Thus, in order to protect the confidential nature of this information, the names of all the sites and their locations, companies, and consultants used in this book are fictitious. Any similarity to actual sites,

companies, and consultants is a coincidence. Although case descriptions are necessarily generic, site facts pertaining to facility operations and analytical data that are reported in public records (e.g., regulatory agency files) have been presented in sufficient detail to correctly represent the technical information found therein.

Based on the authors' experience, this book has been organized into four areas. Chapters 1 through 4 comprise the first section of the text and provide an introduction to the process of environmental forensics, as well as the historical basis of chemical handling and solid and liquid waste management, representing a "core" for understanding environmental contamination issues. A review of environmental law and insurance issues is presented in order to establish the bases of environmental litigation. Each of the chapters in the first section is intended to provide a general understanding of the key components associated with the environmental forensic process.

Recognizing that forensic opinions must be based on fundamental scientific/engineering principles, specific technical chapters on the most commonly employed principles and methods utilized in environmental forensic investigations are presented in Chapters 5 through 9, which constitute the second section of the book.

The third section of the book combines, in Chapters 10 through 13, an introduction to essential environmental forensic support functions. These functions address the development and presentation of scientific information, understanding the admissibility of evidence, the application of mediation methods for settling cases, and forensic case management.

The fourth section of the book, Chapters 14 through 23, provides, through the vehicle of case studies, examples of the environmental forensic process in which the authors have participated. One might normally assume that the genesis of an environmental forensics case begins with site contamination. In actuality, it begins much earlier with the historical study of chemicals, hazardous substances, waste management and disposal practices, and regulations. Litigation, however, is usually based on the actual and potential costs associated with a cleanup or health-related damages. Environmental litigation in many cases is also the result of insurance claim disputes. As a consequence, environmental forensic experts are retained to provide their services in "typical" forensic cases that can be grouped into the following areas.

**Minimizing the Damage** In private-party disputes, prior to the point where a regulatory agency establishes a final remedial action plan (i.e., the cost of the cleanup), a client may retain experts to provide a realistic assessment of the future environmental cost. In these cases, a client might be asked to pay what appears to be an unjustifiably high remedial cost. Thus, it is the objective of the forensic scientist to provide factual data and testimony to support a more realistic and, hopefully, reduced cleanup cost. Examples of minimizing site damages are given in Chapters 14 and 15.

**Allocation of Damages (Cost)** Once a final remedial action plan (RAP) has been adopted for a site and there are no disputes over the RAP, a client may retain experts to assist with the allocation of the cost, as projected in the RAP, between the responsible parties. In these cases, it is the objective of the forensic scientist to provide factual data and testimony to support a minimum percentage allocation for his or her client and, at times, to aid the search for other potentially responsible parties. Allocation examples are described in Chapters 16 through 18.

**Insurance-Related Litigation** Insurance litigation usually involves either environmental impairment liability (EIL) or comprehensive general liability (CGL) insurance coverage. The differences between these two types of insurance are detailed in Chapter 4. As a forensic expert hired by either an insured or an insurer, various policy-dependent issues must be addressed.

In EIL cases, the forensic experts are expected to provide facts and testimony regarding knowledge of the occurrence of site contamination, the cause or causes of the contamination, and the damage, which is presumably covered by the EIL policy.

Conversely, CGL cases require not only a study of facts prior to contamination, but also a detailed forensic analysis of the fate and transport of the contaminant, over time, as well as the effect of any subsequent contamination.

In general, the typical insurance cases that require expert testimony focus on (1) when the event giving rise to the contamination first took place, and in the case of EIL coverage, the date a claim for money or damage was actually made (these examples are given in Chapters 19

and 20); (2) the cost of the remedial work versus normal business costs (this example is illustrated in Chapter 21); (3) if the contamination was the result of a sudden and accidental event (this example is described in Chapter 22); and (4) if the pollution was expected and intended (this example is given in Chapter 23).

Special thanks go to the contributing chapter authors as well as to Dr. Nelson L. Nemerow, who provided a constructive review of the text. We owe a sincere debt of gratitude to Paula Massoni for her patience and skill in editing the text. A thank you is also extended to John R. Kiefer for his assistance with analytical cost and engineering analyses.

It is anticipated that a second edition of this text will be based on additional case histories. In this regard, if any reader would like the authors to consider a case history contribution, please contact the senior author at: <http://www.psfmaenv@pacbell.net>.

Finally, the authors are hopeful that the information, guidance, and history provided in this text will assist the reader in understanding the multidisciplinary focus of environmental litigation where science, engineering, and law are united in the forensic process to bring about practical solutions to complex disputes.

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