

Sampling Environmental Media



James Howard Morgan, editor



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Peer Review Policy

Each paper published in this volume was evaluated by three peer reviewers. The authors addressed all of the reviewers' comments to the satisfaction of both the technical editor(s) and the ASTM Committee on Publications.

To make technical information available as quickly as possible, the peer-reviewed papers in this publication were prepared "camera-ready" as submitted by the authors.

The quality of the papers in this publication reflects not only the obvious efforts of the authors and the technical editor(s), but also the work of these peer reviewers. The ASTM Committee on Publications acknowledges with appreciation their dedication and contribution to time and effort on behalf of ASTM.

Foreword

This publication, *Sampling Environmental Media*, contains papers presented at the symposium of the same name, held on 5–7 April 1995. The symposium was sponsored by ASTM Committee D-34 on Waste Management. James Howard Morgan of The MITRE Corporation at Brooks Air Force Base, Texas presided as symposium chairman and is editor of the resulting publication.

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Overview

In order to protect human health and ecology, measurements and samples of the earth's many different media are required to characterize and remediate pollution in our environment. Samples and measurements of the environment's condition are organized to depict conceptual site models (CSMs), representative of actual conditions by environmental professionals, who use them as decision-making tools. The systems for collecting, preserving, analyzing, and applying the information obtained from samples representative of various environmental media are often not comparable or well understood. Frequently, sampling error distorts or adversely impacts the conceptual models and the consequent decisions affecting pollution management.

The Symposium for Sampling Environmental Media was sponsored by the ASTM Committee D-34 for the purpose of encouraging the exchange of knowledge about environmental sampling. Sampling equipment, techniques, and systems were examined during the symposium to determine their representativeness with regard to a true picture of environmental conditions and the critical elements to successfully apply and use those sampling tools. Samples of all the earth's materials and media are collected to characterize real-world environmental conditions. ASTM environmental committees have traditionally organized themselves by materials and media association, (for example, the Committee D-18 on Soil and Rock or Committee D-34 on Waste Management). It was the intention of the organizers that this symposium would address issues requiring integration of resources and expertise from across all of the ASTM environmental committees. Session chairpersons, presenters, and authors of papers presented at the symposium represented the membership of ASTM Committees D-18, D-19, D-22, D-34, E-47, E-50, and E-51. Topics presented at the symposium required integrated analysis from the disciplines: chemistry, geology, engineering, biology, and risk assessment, as well as an understanding of technical challenges when sampling environmental media in air, soil and rock, soil gas, surface water, wastewater, groundwater, or solid waste. Thirty-one peer reviewed papers are collected in this volume. Support and cooperation from each of the ASTM main committee's writing environmental standards has brought both the symposium and this volume to fruition.

Papers in this publication are organized according to their associated sessions at the symposium. Individual sessions were presented on the following topics:

- Sampling Systems
- Worker Safety and Risk Characterization
- Direct Push Sampling
- Sampling Media
- Sampling Subsurface Media
- Sampling Strategies
- Soil and Soil Gas Sampling
- Innovative Measurements
- Quality Assurance/Quality Control

Readers of this ASTM publication will find it to be an informative and useful reference on many topical environmental sampling issues. ASTM STP 1282 focuses on sampling issues

related to the construction or analysis of CSMs. This volume may also serve as a resource guide for identifying ASTM standards related to environmental management and environmental sampling. Included with A. Ivan Johnson's paper entitled "The Accelerated Development of Standards for Environmental Data Collection," is an appendix listing all the environmental standards developed by ASTM. Use of these standards have assisted in improving sample comparability across the environmental management profession.

A number of important themes are consistently woven throughout the papers included within. Among them are: (1) faster, cheaper, better; (2) practical, common-sense approaches; (3) applications for unique, imaginative and innovative science; and (4) integrated environmental systems management. Each of the themes reflect current issues and concerns facing the environmental industry. Many of the papers address real solutions to problems that challenge the application of these themes when constructing a CSM. For example, from Colorado Springs, Colorado, Susan Soloyanis' paper entitled, "A Common Sense Strategy to Expedite Hazardous Waste Site Cleanup" incorporates elements of all four themes and provides a practical guide for achieving cost-effective and timely clean-up remedies that are protective of human health and the environment. From Birmingham, England, P. D. Hedges' paper discussing "Airborne Remote Sensing as a Tool for Monitoring Landfill Sites Within an Urban Environment" describes a practical use of very advanced remote sensing tools and further advances the theme "applications of unique, imaginative and innovative science." One pragmatic site characterization sampling tool discussed frequently at the symposium was the use of a cone penetrometer to characterize contaminants in soil, soil gas, and groundwater. Several papers presenting unique and imaginative methods for applying this sampling tool are:

- Methods of Determining In-Situ Oxygen Profiles in the Vadose Zone of Granular Soils
- The Multiport Sampler: An Innovative Sampling Technology
- Detailed Characterization of a Technical Impracticability Zone Using Drive Point Profiling
- Research and Standardization Needs for Direct Push Technology Applied to Site Characterization

Other papers of special note are:

- Estimation of Volatile Organic Compound Contamination in the Vadose Zone: A Case Study Using Soil Gas and Methanol Preserved Soil Sample Results
- Utilization of Soil Gas Monitoring to Determine the Feasibility and Effectiveness of In-Situ Bioventing in Hydrocarbon Contaminated Soils
- Innovations to the CERCLA Remedial Investigation Process at Closure Bases

The collection of samples and data representative of a media's real environmental condition is the most fundamental challenge to construction of a realistic CSM. Collection of representative samples and development of realistic CSMs are the environmental industries' foundation for effective human health and ecological risk management. Each year numerous advances occur with respect to collecting representative samples of environmental media. With each advance, a new technical issue or applied integration problem also occurs. Consequently, every environmental professional is challenged to seek a broader environmental

data base and future symposia focusing on advances of the environmental sampling techniques and methods will be needed. A second symposium for sampling environmental media is being planned by ASTM's environmental committees for the spring of 1997.

James Howard Morgan

The MITRE Corporation,
Symposium Chairman and Editor.

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