THE NIELSEN ENVIRONMENTAL E-SCHOOL

Catalog

The Low-Flow Purging & Sampling and No-Purge Sampling E-Course

Designed & Instructed By:
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THE LOW-FLOW PURGING & SAMPLING AND NO-PURGE SAMPLING E-COURSE

Collection of ground-water samples from monitoring wells is a critical component of environmental investigations at many sites. Traditional ground-water sample collection methods, including well-volume purging and sampling using bailers and high-flow-rate pumps, and purging wells to dryness prior to sampling, are subject to significant sources of bias and error that commonly result in either over- or under-estimation of actual sample concentrations and poor precision and accuracy. Given the magnitude of the decisions that are made based on these data, the technical and economic impacts of using these outdated sampling methods can be enormous. It is thus exceedingly important to use more up-to-date methods, like low-flow purging and sampling and no-purge sampling, which have been demonstrated by many field research studies to produce higher quality samples so all stakeholders can have much higher confidence in sample analytical results.

This 13-module E-Course comprehensively covers the topic of ground-water sampling using the U.S. EPA-developed and approved procedure referred to as low-flow purging and sampling (and sometimes as low-stress purging, Micropurging or minimal drawdown purging), and the newer methodology referred to as no-purge sampling. This E-Course explains why and how low-flow purging and sampling and no-purge sampling produce dramatically improved and more consistent sampling results AND significant cost savings. The first 2 modules of the course set the stage for the remainder of the course by covering the science behind ground-water sampling, including collection and use of water-level data; sources of bias and error in water-level measurement; correct procedures for measuring water levels in wells; the importance of developing an understanding of the physical and chemical properties of ground-water samples; how samples should be collected and handled to preserve these properties; how traditional (well-volume) purging and sampling methods can result in significant sources of error in field and lab analyses; and how and why more up-to-date (low-flow and no-purge) sampling methods provide much-improved sampling results.

The remainder of the course focuses on the elements included in conducting low-flow purging and sampling and no-purge sampling programs; what types of ground-water sampling equipment are compatible with low-flow sampling (electric submersible pumps, bladder pumps and other positive-displacement pumps); selection, operation and use of no-purge sampling devices (HydraSleeve, passive diffusion bag sampler and snap sampler); proper use of water-level measurement equipment during low-flow purging and sampling; how to measure critical field water-quality indicator parameters during low-flow sampling; field equipment decontamination procedures; implementation of field quality assurance/quality control protocols to ensure both precision and accuracy in ground-water sampling events; ground-water sample pre-treatment methods (filtration and preservation); ground-water sample handling and shipment; and documentation of ground-water sampling events to ensure defensibility of data.

The field video portions of these modules focus on all of the field practices and procedures used to effectively implement low-flow and no-purge ground-water sampling events, including operation and use of a variety of pumps; pump setting and operation for low-flow purging and sampling; water-level measurement and field water-quality indicator parameter measurement to stabilization; assembly, deployment and retrieval of no-purge sampling devices (HydraSleeve and PDBS); sample collection, filtration and preservation; proper collection of field quality control samples; sample packaging and shipment; and field equipment decontamination.

Total Number of E-Modules in This E-Course: 13

Total CEUs for This E-Course: 15 CEUs

Price (Without Option for Professional Certification): $1295.00

E-MODULES INCLUDED IN THE LOW-FLOW PURGING & SAMPLING AND NO-PURGE SAMPLING E-COURSE

E-Modules included in The Low-Flow and No-Purge Sampling E-Course are listed under specific topics covered in the E-Course. You may take the entire package of 13 E-Modules listed below, OR you may take any of the individual E-Modules separately. Detailed descriptions and outlines for the individual E-Modules are included below.

Price for Each E-Module is $159.00

Topic: The Science Behind Ground-Water Sampling

Have you ever wondered if there is a better method than you are currently using for collecting more representative water-level data and ground-water samples from your wells? Ever thought about all of the various sources of bias and error in water-level measurement and sample collection procedures and wondered how each could affect the data in your sampling program? **This series of 2 modules (GWM-18 and GWM-19)** provides an in-depth discussion of how water-level measurement and ground-water sampling protocols have evolved over the years and how, through decades of research, modern sampling methods (when implemented properly) can yield vastly improved field data and more representative ground-water samples. Learn how to anticipate and avoid the many potential sources of bias and error that may occur in water-level measurement and ground-water sampling programs, and what factors can affect the representative nature of the samples you collect. Field videos are included within the first module to explain how to collect ground-water level measurements using several different methods. **While you may opt to take just one of these modules, it is strongly recommended that you take both modules in the prescribed order if you want comprehensive coverage of the subject.**

Module GWM-18 (Total Length 80 minutes)
The Science Behind Ground-Water Sampling (Part 1): Objectives of Ground-Water Sampling; The Importance of High-Quality Data; Uses of Water-Level Data; Water-Level Measurement Methods and Procedures; Recognizing and Avoiding Sources of Bias and Error in Water-Level Measurement

- Objectives and Purposes of Ground-Water Sampling
  - Collection of Representative Water-Level Data
  - Collection of Representative Water Chemistry Data
- The Importance of High-Quality Data in Ground-Water Sampling
  - Accuracy, Precision and Bias
- Ground-Water Level Data
  - Uses of Water-Level Data
  - General Methods for Water-Level Measurement
  - Water-Level Measurement Methods
  - Sources of Bias and Error in Water-Level Measurement

Total CEUs for Module GWM-18: 1.2 CEUs

Module GWM–19 (Total Length: 70 minutes)
The Science Behind Ground-Water Sampling (Part 2): Sources of Bias and Error in Ground-Water Sampling; Conditions Under Which Ground Water Occurs; Factors Affecting the Representative Nature of Ground-Water Samples

- Sources of Bias and Error in Ground-Water Sampling
  - Purging Practices, Field Parameter Measurement, Ground-Water Sample Collection
- Definition of a “Representative” Sample
- Conditions Under Which Ground Water Typically Occurs
- Factors Affecting the Representative Nature of Ground-Water Samples
  - Sampling Point Placement, Design, Installation and Development
  - Formation and Well Hydraulics Between and During Sampling Events
  - Chemistry of the Water Column Above and Within the Well Screen
  - Well Purging and Sampling and Associated Issues

Total CEUs for Module GWM-19: 1.2 CEUs

Topic: Low-Flow Purging and Sampling

Traditional ground-water sample collection methods, including well-volume purging and sampling and purging a well to dryness, are subject to significant sources of bias and error that commonly result in either over- or under-estimation of actual sample concentrations and poor precision and accuracy. It is thus exceedingly important to use more up-to-date methods, like low-flow purging and sampling, which has been demonstrated by many field research studies to produce higher quality samples so all stakeholders can have much higher confidence in sample analytical results. This module comprehensively covers the topic of low-flow purging and sampling, and explains why and how low-flow purging and sampling always produces dramatically improved and more consistent sampling results and significant cost savings. Field videos are included within this module to help explain the practices and procedures required to implement low-flow purging and sampling.

Module GWM–23 (Total Length: 58 Minutes)
Practices and Procedures for Low-Flow Purging and Sampling

- Fundamental Concepts – What it is, How it Works
- Discussion of ASTM Standard D 6771 on Low-Flow Purging and Sampling
- Requirements for Equipment and Flow Rates
- Well Hydraulics During Low-Flow Purging and Sampling
- Procedures Used and Avoiding Common Errors in the Field
- Dedicated vs. Portable Equipment Considerations
- Advantages and Limitations of Low-Flow Purging and Sampling

Total CEUs for Module GWM-23: 1.0 CEU

Topic: Selection and Operation of Ground-Water Purging & Sampling Devices

There are a lot more useful and appropriate purging and sampling device options available than the bailer! Learn what types of sampling devices are appropriate for a variety of analytical parameters, and which devices should never be used for some parameters. **This series of 2 modules (GWM-20 and GWM-21)** provides a detailed discussion of a wide range of devices available for purging and sampling ground-water monitoring wells, including their principles of operation, operational characteristics, materials of construction, and limitations. The discussion will provide a framework for evaluating any device to determine its suitability and appropriateness for site-specific and individual well-specific applications. Field videos are included within each module to explain the operation and use of a variety of sampling devices. **While you may opt to take just one of these modules, it is strongly recommended that you take both modules in the prescribed order if you want comprehensive coverage of the subject.**

Module GWM–20 (Total Length: 42 minutes)
Purging and Sampling Device Selection Criteria; Operational Characteristics, Applications and Limitations of Grab Samplers, Suction-Lift Pumps & Electric Centrifugal Submersible Pumps

- Purging and Sampling Device Selection Criteria
- Discussion of ASTM Standard D 6634 on Selection of Purging and Sampling Devices for Ground-Water Monitoring Wells
- Impacts of Sampling Devices on Sample Chemistry
- Overview of Available Sampling Devices - Operational Characteristics and Limitations
    - Types of Devices Available
        - Grab Samplers
        - Peristaltic and Suction-Lift Pumps
        - Electric Centrifugal Submersible Pumps

Total CEUs for Module GWM-20: 1.0 CEU

Module GWM–21 (Total Length: 58 minutes)
Operational Characteristics, Applications and Limitations of Positive Displacement Pumps (Gear-Drive Electric Submersible Pumps, Double-Acting Piston Pumps, Bladder Pumps and Gas-Drive Pumps) and Inertial-Lift Pumps

- Overview of Available Sampling Devices - Operational Characteristics and Limitations (continued)
    - Types of Devices Available
        - Positive Displacement Pumps
            - Electric Gear-Drive Submersible Pumps
            - Double-Acting Piston Pumps
            - Bladder Pumps
            - Gas-Drive Pumps
        - Inertial-Lift (Tubing/Check Valve) Pumps

Total CEUs for Module GWM-21: 1.0 CEU

Topic: Field Parameter Measurement During Well Purging

Measurement of field water-quality indicator parameters is a fundamental component of all low-flow purging and sampling approaches to collecting ground-water samples from monitoring wells. This module explains how to correctly measure the most common water-quality indicator parameters (including pH, specific conductance, dissolved oxygen and redox potential) and physical parameters (temperature and turbidity) used in conjunction with purging wells to ensure the collection of accurate data. You will learn which parameters to measure to achieve sampling program objectives and how to identify when field data do not make sense, and what the cause(s) may be. Field videos are included in this module to explain the practices and procedures used for field parameter measurement.

Module GWM–25 (Total Length: 71 minutes)
Field Water-Quality Indicator Parameter Measurement During Well Purging

- Parameters Traditionally Measured and Why They May Not All be Meaningful
- Which Are the Most Meaningful Parameters to Measure During Purging and Why
- Turbidity – to Measure or Not to Measure During Purging?
- How and Where to Measure Field Water-Quality Parameters
- Instrument and Sensor Options for Field Water-Quality Data Measurement
- Common Problems in Field Parameter Measurement and Solutions to Those Problems
- Evaluating the Need to Measure Field Parameters During No-Purge Sampling

Total CEUs for Module GWM-25: 1.2 CEUs

Topic: No-Purge Sampling

Traditional ground-water sample collection methods, including well-volume purging and sampling and purging a well to dryness, are subject to significant sources of bias and error that commonly result in either over- or under-estimation of actual sample concentrations and poor precision and accuracy. It is thus exceedingly important to use more up-to-date methods, like no-purge sampling, which has been demonstrated by many field research studies to produce higher quality samples so all stakeholders can have much higher confidence in sample analytical results. This module comprehensively covers the methodology referred to as no-purge sampling, and explains why and how no-purge sampling always produce dramatically improved and more consistent sampling results and significant cost savings. Field videos are included within this module to help explain the practices and procedures required to implement no-purge sampling.

Module GWM–24 (Total Length: 40 minutes)
Practices and Procedures for No-Purge Sampling

- Fundamental Concepts – What it is, How it Works
- Understanding the Concept of Equilibrated Grab Samplers
- Equipment Used for No-Purge Sampling
- Procedures Used for No-Purge Sampling
- Advantages and Limitations of No-Purge Sampling

Total CEUs for Module GWM-24: 1.0 CEU

Topic: Field Equipment Decontamination Procedures

It is a common practice to use a variety of field equipment that travels from well to well during a ground-water sampling event. Portable equipment such as water-level gauges, flow cells, analytical instruments and multi-parameter sondes are examples of some equipment that is used in each monitoring well, even in situations where dedicated pumps are used. And, of course, where portable pumps are used, the pump (and, in many cases, the discharge tubing) will also travel from well to well. To avoid the potentially very serious and costly problem of monitoring well cross-contamination, it is critical to implement thorough and effective field equipment cleaning protocols. This module discusses in detail field equipment cleaning protocols that apply to drilling, soil sampling and ground-water sampling field equipment. Learn why a few of the "detergents" commonly used for field equipment cleaning should be avoided for some field applications because they may contain phosphates, and why others may introduce trace amounts of semi-volatile compounds if not diluted sufficiently. Field videos are included within this module to explain the practices and procedures used in decontamination of field equipment used in ground-water sampling events.

Module GWM–16 (Total Length: 99 Minutes)
Field Decontamination Procedures for Ground-Water Sampling Equipment

- Objectives of Field Equipment Decontamination
- Considerations for Selection of an Effective Field Decontamination Protocol
- Discussion of ASTM Standards D 5088 and D 5608 on Field Equipment Decontamination
- Problems Associated With Using Chemical Desorbing Agents
- QA/QC Elements of Equipment Cleaning Programs
- Verifying the Effectiveness of Field Decontamination Efforts

Total CEUs for Module GWM-16: 1.7 CEUs

Topic: Field Quality Assurance/Quality Control Practices

You think your sampling team does a good job in the field, but how can you be sure, and have the confidence that the results they produce are valid and defensible? Learn how to ensure that your sampling practices are technically and legally defensible and how to prove to outside groups and auditors that the data being generated during a sampling event can be validated. In the real world, a lot of attention is placed on ensuring that laboratory data are defensible and can be validated, but the same is not always true for field work. The only way to have confidence in your ability to validate results of a sampling event is to have a strong field Quality Assurance/Quality Control program in place. This module explains in detail how to implement an effective field QA/QC program, exactly what elements should be included in field QA/QC programs, and the importance of collecting a variety of field QC samples. Field videos are included within this module to explain how to properly collect field QC samples during a ground-water sampling event.

Module GWM–17 (Total Length: 69 minutes)
Field Quality Assurance/Quality Control Practices for Ground-Water Sampling Events

- Understanding the Difference Between Quality Assurance and Quality Control
- Why Field QA/QC is so Important
- How much QA/QC do You Need?
- Typical Components of a Field QA/QC Program for Ground-Water Sampling
- Detailed Discussions of the Types of QC Samples to Incorporate Into a Ground-Water Sampling Event
    - Which QC Samples to Include for Ground-Water Sampling Events and Why
    - How to Correctly Collect QC Samples for Ground Water While Avoiding Common Errors in the Field

Total CEUs for Module GWM-17: 1.2 CEUs

Topic: Ground-Water Sample Pre-treatment – Filtration and Preservation

Ground-water sample chemistry, by nature, will change within seconds as samples are brought from in-situ conditions (within the ground-water system, where it is at higher pressure and stable pH and temperature relative to atmospheric conditions) to the surface. When these changes occur, the representative nature of the sample is compromised. **This series of 2 modules (GWM-26 and GWM-27)** discusses in detail the sample pre-treatment methods, including sample filtration and preservation, that must be implemented in the field at the time of sample collection (not later, in the laboratory) to protect the physical and chemical integrity of the samples from the time the sample container is filled to the time it is extracted or analyzed in the laboratory. Upon completing these modules, you will know how to recognize and avoid several significant but common sources of error associated with field filtration and preservation of ground-water samples. Field videos are included within each module to explain the practices and procedures used in filtration and preservation of ground-water samples. **While you may opt to take just one of these modules, it is strongly recommended that you take both modules in the prescribed order if you want comprehensive coverage of the subject.**

Module GWM–26 (Total Length: 51 minutes)
Ground-Water Sample Filtration

- Field Filtration of Ground-Water Samples
    - Objectives and Purposes of Sample Filtration
    - Naturally Occurring vs. Artifactual Turbidity in Samples
    - Filtration Methods Available for Ground-Water Samples
    - Discussion of ASTM Standard D 6564 on Field Filtration of Ground-Water Samples
    - Which Parameters Should and Which Should Not be Filtered
    - Filter Preconditioning – What it is, Why and How it Should be Done

Total CEUs for Module GWM-26: 1.0 CEU

Module GWM–27 (Total Length: 40 minutes)
Ground-Water Sample Preservation

- Physical and Chemical Preservation of Ground-Water Samples
    - Objectives and Purposes of Sample Preservation
    - Physical Sample Preservation – Things You Never Thought of as Sample Preservation
    - Chemical Preservation of Samples – When, Where and How it Should be Done
    - Overview of ASTM Standard D 6517 on Field Preservation of Ground-Water Samples
    - Elements of QA/QC for preservation of samples

Total CEUs for Module GWM-27: 1.0 CEU

Topic: Ground-Water Sample Handling and Shipment

Samples are collected and now you are ready to get them to the laboratory so they can be analyzed. You have a vested interest in ensuring that the samples arrive at the laboratory on-time and in one piece. As a sampling team member, if you are the one presenting the samples to an outside group for delivery to the lab, you are referred to as the sample “shipper” and, as such, you are taking on the responsibility of ensuring that samples are delivered in compliance with applicable shipping laws. That is a critical fact that many samplers are unaware of. This module discusses issues associated with delivery and shipment of both uncontaminated and hazardous samples from the field to the laboratory. While this module will not certify you to ship hazardous substances, it will give you an awareness of regulatory requirements, which include training. Field videos are included within this module to explain proper practices and procedures for ground-water sample handling and shipment.

Module GWM–28 (Total Length: 66 minutes)
Ground-Water Sample Handling and Shipment

- Options for Getting Samples to the Laboratory
- Preparing for Sample Shipment
- Discussion of ASTM Standard D 6911 on Packaging and Shipping Environmental Samples for Laboratory Analysis
- Mechanisms to Protect Samples From Tampering During a Sampling Event and Shipment to the Laboratory
- Understanding the Role of Chain-of-Custody Forms – Their Purpose, When and How They Should be Completed
- Overview of DOT and IATA Shipping Regulations and How These Regulations Affect Getting Samples to the Laboratory
- How to Correctly Pack a Cooler Containing Uncontaminated Samples for Delivery
- What Happens to Samples When They Arrive at the Laboratory

Total CEUs for Module GWM-28: 1.1 CEUs

Topic: Sampling Event Documentation

Document… document… document! Paperwork is the part of a sampling event that sampling teams hate the most! This module explains in detail the various mechanisms available for documenting field activities, taken from the approach of ensuring that mechanisms are in place to make certain that your field documentation is both traceable and defensible. The three key options for field recordkeeping - written records, electronic records and audio-visual records - are discussed in detail in this module. This module is appropriate not only for sampling team members but also for regulatory personnel who may be involved in enforcement cases that require the collection of evidence for court cases.

Module GWM–29 (Total Length: 92 minutes)
Documentation of Ground-Water Sampling Events

- Detailed Discussion of the Secrets to Keeping Written Records
  - Types of Written Records to Address in the Sampling & Analysis Plan
  - Field Forms – Pros and Cons of Loose Forms
  - Site-Specific Bound Field Notebooks
  - What to Record and What Not to Record in Your Field Notes
  - Overview of ASTM Standard D 6089 on Documenting a Ground-Water Sampling Event
  - Avoiding Common Errors in Recording Written Notes in the Field
  - Use of Error Codes in Field Notes When an Error is Made
- Electronic Records
  - Advantages and Limitations of Electronic Information Recording
  - Managing E-Documents in the Field and in the Office
  - Think Twice Before Sending That E-Mail
- Audio-Visual Recordkeeping
  - Getting Written Approvals
  - Audio Recordings – Do's and Don'ts
  - The Great Debate: Digital vs. Print Film Cameras
  - Camera Lens Considerations
  - Video Cameras – to Use or Not to Use?

Total CEUs for Module GWM-29: 1.5 CEUs

Meet Your E-Training Instructors

David M. Nielsen, C.P.G., C.G.W.P., P.Hg.

David M. Nielsen is President of Nielsen Ground-Water Science, Inc., the parent company of The Nielsen Environmental E-School and The Nielsen Environmental Field School. He is a Certified Professional Geologist (AIPG #5040), a Professional Hydrogeologist (AIH #991), a Certified Ground-Water Professional (AGWSE #179) and a Certified/Licensed/Registered Professional Geologist in 7 states (AK, AR, DE, FL, IN, SC, TX). He has 40 years of experience in ground-water and environmental consulting, training and research. He has managed ground-water contamination investigations, environmental site assessments, ground-water monitoring and sampling programs, petroleum hydrocarbon spill investigations and remedial projects across the U.S. David was one of the primary instructors for Princeton Groundwater's Groundwater Pollution and Hydrology Course for 12 years, and he has also developed curriculum for and instructed: undergraduate, graduate and continuing education courses in ground-water science at Wright State University; Technology Transfer workshops on Environmental Site Characterization and Ground-Water Monitoring and Sampling for the U.S. EPA; Waste Management, Inc.'s Landfill University; and a one-year Hydrogeologic Training Program for the Environmental Response Division of the Michigan Department of Environmental Quality. He has instructed more than 500 ground water and environmental science short courses and workshops for consulting firms, regulatory agencies, industrial concerns, the Department of Defense, the U.S. EPA, trade and professional organizations, educational institutes and universities in the U.S., England, Canada, Australia, Guatemala and Mexico.

David is former Chairman of ASTM Subcommittee D-18.21 on Ground-Water and Vadose Zone Investigations, a consultant to the U.S. EPA Science Advisory Board, a member of the U.S. Department of Defense SERDP/ESTCP Peer Review Panel, and an advisor to the U.S. Department of Energy National Advanced Drilling and Excavation Technology Program. He is the editor and a contributing author for *The Practical Handbook of Environmental Site Characterization and Ground-Water Monitoring* (First and Second Editions; 1991 and 2006), *The Essential Handbook of Ground-Water Sampling* (2007) and *Technical Guidance on Low-Flow Purging and Sampling and Minimum-Purge Sampling* (2002). He is also a member of AIPG, the Association of Ground Water Scientists and Engineers, the American Institute of Hydrology and the Association of Engineering Geologists. He served for 12 years as Editor of *Ground-Water Monitoring and Remediation* and served for 12 years on the Wright State University Geology Department's Board of Counselors. He holds B.A. and M.S. degrees in geology from Miami University (1974) and Bowling Green State University (1977) respectively. Prior to co-founding The Nielsen Environmental Field School and Nielsen Ground-Water Science, Inc., he managed regional offices for two geoscientific and engineering consulting firms, served as Director of Research and Education for the National Ground Water Association and worked for state environmental agencies in Massachusetts, West Virginia and Ohio.
David has also written guidance documents on direct-push technology and ground-water sampling for the U.S. EPA Superfund program, and reviewed dozens of technical reports for the U.S. EPA's Environmental Technology Verification (ETV) program. He is the recipient of the Outstanding Service Award of the Association of Ground Water Scientists and Engineers, The Outstanding Achievement Award of ASTM, and a 4-time recipient of ASTM's Special Service Award.

Meet Your E-Training Instructors

Gillian L. Nielsen, C.E.S., C.G.W.M.S.

Gillian Nielsen is Vice President of Nielsen Ground-Water Science, Inc. the parent company of The Nielsen Environmental E-School and The Nielsen Environmental Field School. She is also Chairman of the International Certification Program for Environmental Samplers and Specialists. She has 37 years of International experience as an environmental and ground-water consultant and trainer. During her professional career she has developed, managed and implemented ground-water monitoring and sampling programs, soil gas monitoring investigations, multimedia environmental sampling programs, RCRA compliance audits, environmental site assessments and remediation programs at hazardous and non-hazardous waste sites in the U.S. and Canada. She has also played a key role in the development and management of corporate standard operating procedures as well as health and safety procedures and policies.

Gillian specializes in developing and instructing a wide variety of field practice-oriented training programs for private industry, consulting firms, state and Federal regulatory agencies, universities, professional and trade associations. She has lectured extensively and taught hundreds of field courses on the topics of ground-water monitoring and sampling, environmental sampling and field sample analysis, design and implementation of soil gas investigations and RCRA compliance throughout the U.S. as well as Canada, England, Guatemala, Mexico and Australia. Gillian also conducts 8-hour health and safety refresher training courses for clients across the U.S. who are involved in environmental contamination investigation and remediation projects. In addition to training, she works closely with industry and consulting firms as a consultant conducting audits of field investigation activities, negotiating with PRPs and regulatory agencies, developing corporate standard operating procedures and health and safety plans and providing technical reviews of site investigation reports. She also works closely with environmental instrumentation companies in the evaluation of new equipment and in development of new instrumentation.

Gillian was a 16-year member of the Editorial Board of *Ground-Water Monitoring and Remediation* and a member of the ASTM Subcommittee D-18.21 task group on ground-water sampling. She is the recipient of Ground Water Publishing Company's Outstanding Service Award for her work on the editorial board of the journal *Ground-Water Monitoring and Remediation* and has received several Standards Development Awards from ASTM. She has authored a number of scientific papers and written many ASTM Standards dealing with ground-water sampling, soil-gas monitoring, field analysis of environmental samples, and field decontamination procedures, and was a contributing author for first (1991) and second (2006) editions of *The Practical Handbook of Environmental Site Characterization and Ground-Water Monitoring* as well as *Technical Guidance on Low-Flow Purging and Sampling and Minimum - Purge Sampling* (2002). She is also a co-editor and contributing author of the text *The Essential Handbook of Ground-Water Sampling*, published in January 2007. Gillian frequently provides technical reviews of state and Federal regulatory agency technical guidance documents. Gillian holds B.Sc. degrees in geography (hydrology) and biology (aquatic) from Trent University in Ontario Canada.