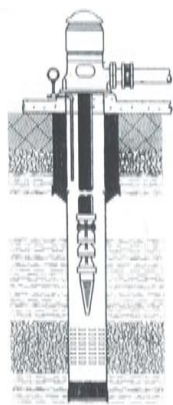


WATER WELL PERFORMANCE:
THE ECONOMIC BASIS FOR SYSTEM OPERATION, REHABILITATION &
MAINTENANCE DECISIONS

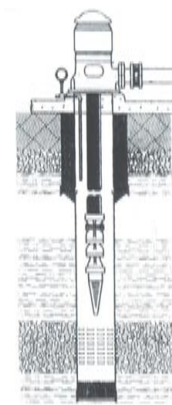
A two-day workshop on practical, cost-effective solutions
to extend asset value by maximizing well performance

Free well-performance software



AMERICAN GROUND WATER TRUST

Independent Authority on Ground Water



Monday, Sept. 25 and Tuesday, Sept. 26, 2006

BEST WESTERN MILL RIVER MANOR

173 Sunrise Highway, Rockville Centre, NY 11570

CEU Credit Available

More than nine hundred utility managers, water industry professionals, regulatory staff, well owners, water users and ground water specialists have attended past American Ground Water Trust workshop programs with a focus on well design, well rehabilitation and maintaining well efficiency in: Baltimore MD; Little Rock AR; Des Moines IA (2); Nashua NH; Houston TX; Lansing MI; Charlotte NC; Cincinnati OH; Wilsonville OR; Lakewood CA; Seattle WA; Richmond VA and Bucks County PA

WHAT IS IT ALL ABOUT?

This program includes fundamental aspects of well design, construction, operation, rehabilitation and maintenance. The Workshop focus is on explaining practical methods for diagnosing the causes of declining yield and in finding cost-effective solutions. Speakers will include consideration of the economic aspects of well operation. This is a multi-disciplinary program with top quality presenters. The program provides up-to-date information about water well rehabilitation technologies and well maintenance from real case study experiences. The workshop will give participants a comprehensive understanding of the economic basis for well design & operation policy.

PROGRAM (Day 1 - Monday, September 25th)

8:45 – 9:15

Andrew Stone, Executive Director, American Ground Water Trust, Concord, NH

OVERVIEW OF THE WORKSHOP PROGRAM

- Basics of wells and water systems
- The importance of groundwater as an economic and environmental resource
- The economic cost of inefficient water wells

9:15 – 10:15

Stephen Terracciano, Office Chief, US Geological Survey, Coram, NY

CHARACTERISTICS OF AQUIFERS ON LONG ISLAND, NY AND SURROUNDING AREAS

- Overview of regional geology
- Typical lithologies of aquifers supplying high yield wells
- Regional water quality issues
- Saline intrusion in coastal aquifers
- Current US Geological Survey research investigations in the region

10:15 – 10:30

BREAK

10:30 – 11:30

Phillip Brown, Hydrogeologist, Golder Associates Inc., Lake Oswego, OR

GROUND WATER ASSET MANAGEMENT:

- Asset Management defined with focus on groundwater supply systems
- The regulatory background
- Approaches for asset tracking and condition assessment of groundwater supply wells
- Risk assessment approaches, prioritization, planning, and implementation
- Approaches to evaluating the elements that contribute to the efficiency of a groundwater supply system
- Well inspection and evaluation methods
- Overview of rehabilitation methods to maintain supply wells
- A summary of asset management benefits to groundwater supply systems

11:30 – 12:30

Neil Mansuy, Vice President, Subsurface Technologies, Newburgh, NY

DECLINE IN WELL PERFORMANCE

- Chemical, microbiological and physical reasons for well problems
- Understanding typical “declining yield” problems
- Case studies of well yield declines attributable to encrustation
- Diagnostic characteristics for rock wells, screened wells, horizontal wells and recharge wells

12:30 – 1:30

LUNCH

1:30 – 2:30

Kevin McGinnis, President, Cotey Chemicals, Lubbock, TX

PRINCIPAL METHODS FOR IMPROVING WELL PERFORMANCE

- Matching the solution to the problem
- Outline of chemical methods used throughout the US (Calcium Hypochlorite, Sodium Hypochlorite, Hydrochloric Acid, Hydrogen Peroxide, etc.)
- Outline of mechanical methods used throughout the US (Surge and bail, hydrojetting, blasting, wire brushing, hydrofracking, CO₂, etc.)

PROGRAM (Day 1 - September 25th continued)

- 2:30 – 3:15** **Bill Gordon, Hydrogeologist, AquaAmerica, Bryn Mawr, PA**
EFFECTIVE WELL MAINTENANCE USING LIQUID CO₂
- How the CO₂ process works to restore well yield in a bio-fouling or mineral fouling situation
 - Wells losing 50% capacity without being pumped
 - Case studies of wells to show how the need for CO₂ injections has changed over the years
 - Well performance changes with and without CO₂ treatment
 - Regulatory perspective that a discharge permit should be at pre-treatment pumping rate!

- 3:15 – 4:00** **Michael Allen, Sales & Marketing Manager, Flowserve Corporation, Hastings, NE**
HOW IMPORTANT IS THE PUMP?
- Information needed for selection of pump. What type of pump?
 - Pump efficiency
 - Horsepower and bowl assemblies
 - Merits of submersible vs. line-shaft
 - Pump replacement benefits - \$ return on upgrading motor or bowls

- 4:00 – 5:00** **Bill Varley, Vice President and Manager, Long Island American Water, Lynbrook, NY**
ECONOMIC CONSIDERATIONS FOR WELL OWNERS
- Supply & demand considerations in the Mid Atlantic Region
 - New well or rehabilitation: (How to calculate the costs of the options for increasing supply)
 - Permit, land acquisition, construction, engineering and testing costs for new wells
 - Rehabilitation costs for increasing yield of existing wells
 - Practical implementation and cost effectiveness of a well maintenance program

- 5:00 – 6:45** **MEET THE PRESENTERS – Reception with cash-bar**

PROGRAM (Day 2 - September 26th)

- 8:30 – 9:30** **Tom Morris, Hydrologist, ASR Systems LLC, Las Vegas, NV**
WELL FACILITY PREDICTIVE MAINTENANCE PROGRAMS:
All participants will be provided with complimentary copies of:
“Well Performance Tracking Software” and,
“Wellfield Maintenance Guide”
- Identification of the well facility processes that can be measured and evaluated
 - Definition of baseline performance and monitoring programs
 - How to manipulate data to evaluate aquifer, pump or wellbore issues
 - How to determine the costs of well performance losses
 - Efficiency indices used to maximize cost savings by deciding when to repair, rehabilitate or replace
 - Explanation of the Well Field Maintenance Guide and Performance Tracking Software

- 9:30 – 10:15** **Don Baron, District Manager, Johnson/Weatherford, Okemos, MI**
IMPORTANCE OF WELL SCREEN SELECTION IN HIGH YIELD WELLS:
- Criteria for well screen selection and placement
 - The role of screens in maximizing well performance and efficiency
 - Pros and cons: well construction materials and well maintenance

- 10:15 – 10:30** **BREAK**

- 10:30 – 11:15** **Henry Hunt, Senior Project Manager, Collector Wells International, Columbus, OH**
ALTERNATIVE WELL DESIGNS
- When to consider a horizontal collector well
 - Advantages of riverbank filtration well systems
 - Using beach wells to develop filtered seawater supplies
 - Well design and the GUDI Rule

- 11:15 – 12:15** **Neil Mansuy, Vice President, Subsurface Technologies, Newburgh, NY**
PREVENTION IS MORE COST EFFECTIVE THAN CURE
- Cost / Benefit evaluation of well rehabilitation techniques used in the US
 - New concepts in well maintenance
 - Case studies on effective well maintenance
 - Preventive maintenance procedures
 - Importance of well maintenance for monitoring and sampling wells

- 12:15 – 1:00** **LUNCH**

- 1:00 – 2:00** **Mike Havener, Vice President, Layne Christensen, Bridgewater, NJ & Roger Miller, Technical Director, Layne Christensen, Kansas City, MO**
SUCCESSFUL REHABILITATION BASED ON SOUND KNOWLEDGE AND RESEARCH
- Knowing the problem and applying the best technology
 - Continual research to understand, improve and develop technologies
 - Case studies involving various problems and applied processes

- 2:00 – 2:45** **Dennis Duty, Senior Field Sales and Service Representative, Baroid IDP, Dillwyn, VA**
IMPORTANCE OF WELL DEVELOPMENT AT TIME OF WELL CONSTRUCTION
- Physical blockage caused by poor selection of drilling fluids
 - Mitigating physical blockage by proper maintenance of drilling fluids
 - Remediation methods for wells not adequately developed during construction

PROGRAM (Day 2 - September 26th)

2:45 - 3:00 **BREAK**

3:00 – 3:45 **EPA and/ State regulatory officials**

REGULATORY AND ENVIRONMENTAL ISSUES

- Water Rights – withdrawal permits - Overview of well construction programs
- Licensing and inspection requirements related to well construction and rehabilitation
- Permits and reporting rules for new wells and for well improvement work
- Well rehabilitation chemicals and the environment –What are the guidelines?
- Chemical and equipment options for removal neutralization and disposal
- Technical assistance available for utilities
- Federal and state funding sources for well improvement

3:45 – 4:00 **GENERAL DISCUSSION – All presenters and participants**

4:00 **ADJOURN – CEU sign-out**

SPEAKER BIOGRAPHIES

Michael M. Allen, Sales & Marketing Manager, Flowserve Corporation, Hastings, NE: Mr. Allen has a BS Mechanized Agriculture, Univ. of Nebraska. Since 1995 he has been Sales and Marketing Manager, Ground Water Development North America, Ingersoll Dresser Pump/Flowserve Pump Division. He serves on the NE Water Well Standards and Contractors Licensing Board. He also serves on the NE Water Resources Assoc., Board of Directors. From 1985 to 1991 he was a Product Engineer for Ingersoll-Rand Co. Vertical Turbine Pump Division. From 1991 to 1995 he was Western Region Sales and Distribution Center Manager for Ingersoll-Rand/Ingersoll Dresser Pump with responsibility for sales development in western third of U.S.

Don Baron, District Manager, Johnson/ Weatherford, Okemos, MI: Mr. Baron has a MA in Geology from the Univ. of South Dakota (Vermillion, SD) and a BA Geology - Univ. of St. Thomas (St. Paul, MN). He worked for Johnson Screens from 1973 – 1985, 1988 – Present (17 Years - District Manager; 12 Years - Field Sales). He has sales responsibilities for the Midwest portion of the U. S. including the Dakotas to Michigan and Iowa to Indiana. His Canadian responsibilities include Manitoba to Prince Edward Island for Johnson Screens.

Phillip A. Brown, Hydrogeologist, Golder Associates Inc., Lake Oswego, OR: Mr. Brown has BS and MS degrees in Hydrogeology and Geology from San Diego State Univ. He is a Registered Professional Geologist in OR and WA and a WA Licensed Hydrogeologist. He has 18 years of experience in conducting, staffing, and managing water supply and groundwater resource investigations. His work involves, hydrogeologic and geologic characterizations, and state and federal regulatory site investigations. He has over a decade of experience in the design and installation of groundwater production wells, collector wells, design and analysis of single well, multiple well, and multiple aquifer pumping tests; evaluations of groundwater-surface water interaction; geochemical analysis of waters; contaminant fate and transport; and numerical and analytical numerical computer modeling for groundwater remediation and resource development.

Dennis Duty, Senior Field Sales and Service Representative, Baroid IDP, Dillwyn, VA: Mr. Duty has a BS in Geology from Old Dominion University, Virginia and has been active in the ground water industry for over 25 years. His experience includes 12 years with the USGS as Driller and Manager of Drilling Operations for Eastern Regional Geology. He has also worked for several drilling manufacturing companies servicing the Geotechnical, Environmental and Water Well Industries before joining Baroid. Baroid Industrial Drilling Products provides well drilling products and technical services worldwide. Mr. Duty's current work involves selecting fluids and providing technical support for drilling and well development to maximize well yield and in trouble-shooting and solving declining well yield problems with the use of appropriate dispersants.

Bill Gordon, Hydrogeologist, AquaAmerica, Bryn Mawr, PA: Mr. Gordon has BS in Geology from West Chester University. He is a Registered Professional Geologist in PA and TN. He has over 19 years of experience in conducting and managing water supply and groundwater resource investigations. Currently his work involves hydrogeologic and geologic characterizations, the location, design and installation of groundwater production wells, aquifer pumping tests; evaluations of groundwater-surface water interaction and existing groundwater resource evaluation. In addition, he has 13 years of experience in groundwater remediation in fractured bedrock environments throughout the United States.

Michael C. Havener, P.E., Vice President Layne Christensen Company, Bridgewater, NJ: Mr. Havener has over 27 years of experience in the ground water industry. He graduated from Lehigh University with a BS in Civil Engineering in 1977 and is a registered Professional Engineer in Pennsylvania, New Jersey, New York and Connecticut. Mr. Havener has extensive experience in the design and maintenance of well systems and water treatment plants.

Henry Hunt, Senior Project Manager, Collector Wells International, Columbus, OH: Mr. Hunt's expertise is in the inspection, evaluation, operation and maintenance of collector wells and in preparing feasibility studies for collector wells and other water supply alternatives. This involves economic evaluations for system comparisons and the development of innovative approaches to solving water supply problems. He has been involved with design, installation, maintenance and rehabilitation of collector wells, vertical wells, infiltration galleries, beach wells and surface water intakes in the U. S. and in South America for over 27 years. Mr. Hunt was a co-author of the recent publication: Riverbank Filtration: Improving Source-Water Quality.

Neil Mansuy, Vice President, Subsurface Technologies Inc., Newburg, NY: Mr. Mansuy has 20 years of extensive worldwide well rehabilitation experience. He holds a MS from the Univ. of Regina, Saskatchewan, Canada, specializing in iron-related bacteria and causes of well plugging. He was previously an aquifer and well rehabilitation specialist with Layne GeoSciences Inc. for 10 years. Mr. Mansuy's workshop presentations cover all aspects of well problems and solutions related to lost capacity and water quality problems. Neil is the author of the book, "Water Well Rehabilitation," 1999, Lewis/CRC Press.

Kevin McGinnis, President, Cotey Chemicals, Lubbock, TX: Cotey Chemicals develops products for the rehabilitation and development of all types of water wells. Mr. McGinnis graduated from Texas Tech Univ. in 1984 with a BA degree. He has worked in the water well remediation industry for 10 years. He has delivered technical papers to Saudi Arabia's Ministry of Agriculture and Water in Riyadh, and to the Philippine Water Works Assoc. In addition to his experiences in the U.S., Mr. McGinnis has supervised water well rehabilitation projects in several states of the Middle East, Far East and Latin America.

Roger D. Miller, Technical Director, Layne Christensen Company, Kansas City, MO: Roger Miller is a well expert in the Water Systems Tech Group, which provides R&D and technical support group for Layne's operating divisions. He has a BS in Chemistry and Biology from Central Missouri State University and has over 30 years experience in the water industry with 18 years in the ground water field involved with well problem analysis, development of well rehabilitation chemicals and application processes. He is a national speaker for programs of the AWWA, National Ground Water Association, Rural Water Association, and American Chemical Society.

Tom Morris, Hydrologist, ASR Systems LLC, Las Vegas, NV: Tom has BS in Geology from University of Nevada, Las Vegas. He worked with the Desert Research Institute supervising deep exploratory water well drilling programs to define the Nevada hydrogeology before joining Las Vegas Valley Water District. LVVWD work involved the design and installation of 80 deep wells. For the last 9-years, he has assisted in managing the maintenance and operation of 108 production wells with capacity of 160 Million mgd. He has worked with nearly one hundred utilities throughout the world in developing groundwater injection systems. He was recognized in 2002 by the National Academy of Science for scientific achievements in injection well hydraulics.

Andrew Stone, Executive Director, American Ground Water Trust, Concord, NH: Mr. Stone is a graduate of London University, England and for 12 years was a professor at Rhodes University, South Africa. He has extensive experience as a ground water scientist working on exploration and development projects in the US and overseas. Prior to joining the Trust he worked as a hydrogeologist for a New England consulting company. From 1990 to 2003 he taught an annual course on Ground Water Protection Policy in the MS degree program at Antioch New England Graduate School. In 1999 he received the National Ground Water Association's Oliver Award in recognition of his outstanding contributions to the ground water industry.

Stephen Terracciano, Office Chief, US Geological Survey, Coram, NY: Mr. Terracciano is Chief of the USGS New York Water Science Center, Coram, Long Island Office. He began his career with the USGS in 1986 in Long Island where he conducted ground water modeling studies. He then moved to the USGS Guam Sub District Office for five years where he worked on complex ground water issues throughout the western Pacific. As Coram Office Chief, he oversees projects on Long Island and the City of New York. The science program in the Coram Office is diverse and has a very strong basic data component. Advanced geophysical tools are extensively used in complex ground water investigations to address various water quantity and quality issues affecting the aquifers. He holds a BS degree in Chemistry from Long Island University and a MS degree in Geochemistry from the State University of New York at Stony Brook.

William M. Varley, Vice President and Manager, Long Island American Water, Lynbrook, NY: Mr. Varley graduated with a BS in Civil Engineering Technology from Rochester Institute of Technology in 1981. He is the Vice President and Manager of Long Island American Water which services a population of over 250,000 people in southwestern Nassau County, with deep well production capacity totaling 70 MGD. Prior to joining American Water, he was the District Manager for the Layne Christensen Company, Well and Pump Contract Division on Long Island where he specialized in well and pump evaluations and well reconstructions.

WATER WELL PERFORMANCE: THE ECONOMIC BASIS FOR SYSTEM OPERATION, REHABILITATION & MAINTENANCE DECISIONS



Workshop:

Monday, September 25
and
Tuesday, September 26, 2006
at the
**BEST WESTERN
MILL RIVER MANOR**
173 Sunrise Highway, Rockville Centre, NY



- ◆ Is your selection of “on-off” pumping cycles to blame for declining yields?
- ◆ Is your water from wells? Do you have a well maintenance program?
- ◆ Could your “bad” water test samples be fixed by well rehabilitation?
- ◆ Does your well construction and design include maintenance needs?
- ◆ Do your supply wells have the potential to provide higher yield?
- ◆ Is declining yield related to the aquifer, the pump or the well?
- ◆ Inefficient wells cost money! How much could you save?
- ◆ Do you design, install, operate or maintain water wells?
- ◆ How do you remove encrustation from a well?

REGISTRATION FORM or to register online go to www.agwt.org

WATER WELL PERFORMANCE WORKSHOP
BEST WESTERN MILL RIVER MANOR, Rockville, NY - September 25-26, 2006
(Registration includes workshop handouts, coffee breaks, two lunches and a reception.)

GENERAL REGISTRATION	<input type="checkbox"/> \$325.00
TRUST MEMBERS AND THEIR EMPLOYEES	<input type="checkbox"/> \$275.00
FULL-TIME STUDENTS (College ID required at registration check-in)	<input type="checkbox"/> \$150.00
EXHIBIT TABLE (registration not included)	<input type="checkbox"/> \$300.00
WALK-IN REGISTRATION (<u>On day of event</u>)	ADD \$25.00

CANCELLATION POLICY

◆ Cancellations received in the Trust office by 5 pm (EST) 15 days prior to the start of the event will receive a full registration refund less a \$25 processing fee.

◆ Cancellation 14 days to two days prior to the start of the event will receive a 50% registration refund.

◆ Cancellations one day prior to the start of the event, or on the day of the event, are considered “No Shows.” No refund will be made. (Substitutions gladly accepted).

◆ The Trust will not cancel a conference program because of bad weather conditions. Except that, as the result of an event cancellation resulting from, (but not limited to) circumstances such as a state mandatory evacuation or a fire at the program facility, the Trust will reschedule the event and honor registrations as payment for the new event.

PAYMENT AMT \$ _____ CHECK (Payable to: American Ground Water Trust)
 VISA/MC AMEX PO # _____

Card # _____ Exp. Date _____

Cardholder Name _____ Cardholder Email _____

Name for Registration _____ Registrant E-mail _____

Title _____ Phone _____

Company _____ Fax _____

Address _____ City _____ State _____ Zip _____

✉ Mail to: American Ground Water Trust, 16 Centre Street, Concord, NH 03301

☎ Phone: (603) 228-5444

☎ Return by fax: (603) 228-6557

CONTINUING EDUCATION CREDIT



Employee Development University is a learning partner with the American Ground Water Trust and 1.3 CEU credits are available for conference attendees who complete the sign-in and sign-out sheet at registration and who submit an evaluation form. [Visit www.eduniv.com for more information about this CEU program.]



We recommend you verify applicability with your professional board prior to the event.

HOTEL INFORMATION

A block of rooms has been reserved at Best Western Mill River Manor, 173 Sunrise Highway, Rockville Centre, Long Island, NY, 11570. Reservations can be made toll-free at 1-887-241-7544 between 10:00am and 8:00pm or by contacting reservations@millrivermanor.com. The room rate is \$119 and the cut-off date for the block rate is Tuesday, September 19th.

The hotel is 7 miles from JFK International Airport. The Rockville Center Train Station is close to the hotel. [MTA Long Island Railroad (local) trains from Penn Station & Jamaica Center.]