

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

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

**Lakewood, California – Thursday, October 2nd, 2008**



**The Center at Sycamore Plaza  
5050 Clark Avenue  
Lakewood, CA 90712**



Program presented by:

**AMERICAN GROUND WATER TRUST**

*Ground Water Information, Awareness & Education Since 1986*

**Continuing Education Credits for Operators 7 ½ PDHs**

## **BACKGROUND**

More than fourteen 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 on water well operation, rehabilitation & maintenance in: Baltimore MD; Little Rock AR; Des Moines IA (2); Nashua NH; Houston TX; Lansing MI; Charlotte NC; Denver CO; Cincinnati OH; Wilsonville OR (2); Lakewood CA; Seattle WA (2); Richmond VA, Long Island NY, Bucks County PA, Phoenix AZ, Langley BC and Boynton Beach, FL.

## **WHAT IS IT ALL ABOUT?**

The workshop will help improve asset management assessment skills, increase awareness of the economic importance of sustainable management of assets among engineers, utility operators, and water managers, and address core questions involved in assessing well performance to assist decisions related to, operation, maintenance, rehabilitation and replacement. The program includes fundamental aspects of well design, construction, operation, rehabilitation and maintenance.

This is a multi-disciplinary program that provides up-to-date information about water well rehabilitation technologies and well maintenance from real case study experiences. This program provides water engineers, water managers, well-field operators and well contractors with the latest information about cost-effective installation, operation and maintenance of water wells. The presentation team members are all experienced experts and their presentations will combine the practical aspects of well rehabilitation and maintenance with the economic principles of asset management so that well designers, owners, operators and managers can have a clear-cut basis to make decisions.

- ◆ What proportion of your overall water provision costs is related to well efficiency?
- ◆ Which asset management tools & concepts work best as a basis for decision-making?
- ◆ Do your well construction and design decisions include maintenance needs?
- ◆ What should be included in an RFP for well construction, maintenance or rehabilitation?
- ◆ What diagnostic indices can determine the most effective rehabilitation techniques?
- ◆ Do you know if your supply wells have the potential to provide higher yield?
- ◆ Is declining yield related to the aquifer, the pump or the well?
- ◆ How can you calculate the cost-benefit of maintaining well efficiency?
- ◆ What is the basis for assessing the success of maintenance or rehabilitation?

## PROGRAM

7:30 – 8:15 **REGISTRATION, COFFEE, EXHIBITS AND SIGN-IN FOR CEUs**

8:15 – 8:30 **OVERVIEW OF THE WORKSHOP PROGRAM**

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

- *Ground water as a local, regional and national economic & environmental resource*
- *Water is free! What are the costs of accessing and delivering water?*
- *How to solve the conundrum of identifying well, pump or aquifer problems*
- *What's new in the well rehabilitation decision-making process?*

### MORNING SESSION MODERATOR

Kent O'Brien, Winzler & Kelly Consulting Engineers, Santa Rosa CA, and  
Chair of the AWWA Cal/Nevada Well Water Technology Committee

8:30 – 9:15 **REHABILITATION: IS IT TIME? IS IT WORTH IT?**

Dennis Williams, Research Professor, USC School of Engineering, Upland, CA

- *What causes the well to need rehabilitation?*
- *How do I know when to rehabilitate a well?*
- *Mechanical vs. chemical rehabilitation*
- *Will any kind of preventive maintenance help?*
- *How about well operation? Does this impact rehabilitation?*
- *Frequency and cost considerations in well rehabilitation*
- *Decision tree for well rehabilitation*
- *Example of well rehabilitation program and costs*

9:15 – 10:00 **ASSET MANAGEMENT PRINCIPLES AND IMPLEMENTATION STRATEGIES**

Chris Peterson and Patrick Naylor, MWH Global, Sacramento CA and Boise ID

- *How to compile and interpret true costs*
- *Assessment of well field economics in the context of overall utility assets*
- *Value of an economic model template in rehabilitation/ replacement decisions*
- *Risk-based Approach for Asset Management Prioritization*

10:00 – 10:15 **BREAK            Networking and Exhibits**

10:15 – 11:15 **WELL PERFORMANCE DECLINES: Causes and Cures**

Neil Mansuy, Vice President, Subsurface Technologies, Kansas City, MO

- *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 ASR wells*
- *Prevention is more cost effective than cure:*
  - >*Case studies on effective well maintenance*
  - >*Preventive maintenance procedures*

11:15 – 12:00 **WELL DESIGN FOR HIGH CAPACITY PERFORMANCE**

Bob Turnbull, Senior Hydrogeologist, Roscoe Moss Company, Los Angeles, CA

- *Importance of initial well design (What are the design criteria?)*
- *The importance of post-construction well development*
- *Screen selection criteria (Design for long term performance)*
- *Experiences of restoring well yield*

12:00 – 1:00 **LUNCH**

**AFTERNOON SESSION MODERATOR**  
Suzanne Rowe, Hydrogeologist, CDM, Irvine, CA and  
Member of the AWWA Cal/Nevada Well Water Technology Committee

- 1:00 – 1:30     **IMPORTANCE OF DATA INTEGRITY FOR WELL MAINTENANCE AND OPERATION DECISIONS**  
John Lee, President, Pump Check, Riverside, CA  
- Pump efficiency testing, identifying the weak link in your system  
- Trending pump and well performance with test data  
- Cost/Benefit analysis for replacement/repair and how to reduce pumping costs through prioritized pumping
- 1:30 - 2:15     **SELECTION AND MAINTENANCE OF PUMPS FOR MAXIMIZING WELL YIELD/ COST BENEFITS**  
Geoffrey Bates, Engineer/ Hydrogeologist, General Pump Company, San Dimas, CA  
- *Pump efficiency principles, horsepower and bowl assembly selection criteria*  
- *Closed tube water lubricated VLS well pump systems*  
- *Merits of submersible vs. line-shaft for high yield wells (Installation and O & M costs)*  
- *Pump replacement criteria, \$ return on upgrading motor or bowls*
- 2:15 – 2:45     **COST SAVINGS RESULTING FROM WELL MAINTENANCE: CALIFORNIA CASE STUDIES**  
Scott Riegert, Regional Project Coordinator, Layne Christensen Company, Fontana, CA  
- *Golden State Water Company*  
- *Eastern Municipal Water District*  
- *City of Santa Paula, CA*
- 2:45 – 3:00     **ECONOMIC SIGNIFICANCE OF FLEXIBLE DROP PIPE WHEN WELLS NEED REHABILITATION**  
David Schnitta, Regional Sales Manager, Angus Flexible Pipelines, San Diego, CA  
- *Physical properties of flexible hose (strength and durability of hose)*  
- *Hydraulic performance capabilities (elasticity, pressure thresholds)*  
- *Pump installation and removal logistics (time out and time in)*
- 3:00 – 3:15     **BREAK            Networking and Exhibits**
- 3:15 – 3:45     **WELL PERFORMANCE SOLUTIONS**  
Kevin McGinnis, President, Cotey Chemical Corporation, Lubbock, TX  
- *The arsenal of chemicals available to enhance/ restore well performance*  
- *Matching the solution to the problem (How to decide on the “cocktail” to be used)*  
- *The importance of a dual mechanical/ chemical approach*  
- *Success well-yield restoration case-studies*
- 3:45 – 4:30     **PREDICTIVE MAINTENANCE PROGRAMS FOR PRODUCTION WELLS**  
Tom Morris, Hydrologist, ASR Systems, Las Vegas, NV  
- *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*  
**WELL PERFORMANCE TRACKING SOFTWARE**  
- *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*
- 4:30 – 5:00     **WORKSHOP WRAP-UP – Summary of Lessons Learned**
- 5:00pm         **ADJOURNMENT**

# CONTINUING EDUCATION CREDIT

Employee Development University is an IACET-approved learning partner with the American Ground Water Trust and 0.75 CEU credits (7.5 PDHs) are available for attendees who complete the sign-in and sign-out sheet at registration and who submit an evaluation form.  
[Visit [www.eduniv.com](http://www.eduniv.com) for more information about this CEU program.]

An attendance certificate can be provided to all participants seeking to use this workshop for continuing education credit. Each attendee is responsible for determining the applicability of the program for educational credit through their specific certifying entity or agency.



## REGISTRATION

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

October 2nd, 2008 / 8:15am - 5:00pm  
The Center at Sycamore Plaza, 5050 Clark Avenue, Lakewood, CA 90712

**Registration and payment also available on-line at [www.agwt.org](http://www.agwt.org) (conferences & workshops)**

Registration includes lunch, breaks and CD of well operation software.

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|--|-----------------------------------|
| Pre-registration (General)   | <input type="checkbox"/> \$230.00 |
| Pre-registration (Employees of AGWT Members) (\$250+ Level)            | <input type="checkbox"/> \$180.00 |
| Pre-registration (Full-Time Student) (ID Required at Registration)     | <input type="checkbox"/> \$110.00 |
| Exhibit Table (Registration not included; You must also register.)     | <input type="checkbox"/> \$250.00 |
| Walk-in registration (General \$270, AGWT Member \$210, Student \$130) |                                   |

PAYMENT TOTAL \$ \_\_\_\_\_  CHECK (Payable to: American Ground Water Trust)  
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