

DAY ONE WORKSHOP PROGRAM (mostly well problems)
Richmond, VA - Monday January 24 Bucks County, PA – Wednesday January 26th

8:45 – 9:30 Andrew Stone, American Ground Water Trust

INTRODUCTION

- Overview of the structure and content 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

9:30 – 10:30 Brent Waters, Golder Associates Inc.

GEOLOGY, WELL HYDRAULICS, AND WELL DESIGN

- Hydrogeology and groundwater use in the Mid-Atlantic region
- Regional well yield and water quality issues
- Well drilling methods - Critical well design factors
- Basic well hydraulics (bedrock wells and gravel-packed wells)
- Aquifer and well performance testing (specific capacity, well efficiency)

10:30 – 10:45 **BREAK**

10:45 – 11:30 Henry Hunt, Collector Wells International

ALTERNATIVE WELL DESIGNS

- When to consider a horizontal collector well
(continued)
- Advantages of riverbank filtration well systems
- Using beach wells to develop filtered seawater supplies
- Well design and the GUDI Rule

11:30 – 12:30 Neil Mansuy, Subsurface Technologies

DECLINE IN WELL PERFORMANCE

- Chemical, microbiological and physical reasons for well problems
- Understanding typical “declining yield” problems on mid-Atlantic area wells
- 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 Jim Bailey, Golder Associates

GROUND WATER ASSET MANAGEMENT

- Why rehabilitate - Well inspection technology
- Key well performance indicators - - Prioritizing well condition factors
- A practical approach to managing wells as an asset

2:30 – 3:15 Randy Cracknell, Goulds ITT

HOW IMPORTANT IS THE PUMP?

- Information needed for selection of pump. What type of pump?
- What horsepower and bowl assembly?
- Merits of submersible vs. line-shaft
- Pump replacement benefits - \$ return on upgrading motor or bowls

3:15 – 3:30 **BREAK**

3:45 – 4:30 Andreas Wicklein, pigadi. GmbH

HOW THE EUROPEAN EXPERIENCE CAN HELP WITH REHABILITATION SOLUTIONS

- Well services in Europe – What are the applications for mid-Atlantic wells?
- Strategies used to keep Berlin’s well-based system of 700 wells functioning efficiently
- The development of mechanical rehabilitation technologies
- Creating well maintenance and monitoring programs
- Cost comparison of rehabilitation versus new well development

4:00 – 6:00 **RECEPTION** (cash bar – meet the presenters)

DAY TWO WORKSHOP PROGRAM (mostly well solutions)
Richmond, VA - Tuesday January 25 Bucks County, PA – Thursday January 27

8:15 – 9:15

RICHMOND PROGRAM

Jesse Royall, and John O'Dell, Sydnor Hydro

BUCKS COUNTY PROGRAM Mike Havener, Layne Christensen, and
Jim Schultes, Schultes Well Drilling

OUTLINE OF PRINCIPAL WELL PERFORMANCE SOLUTIONS

- 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.)

9:15 – 9:45 Dennis Duty, Baroid IDP

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

9:45 – 10:30 Andreas Wicklein, Pigadi, GmbH

RESEARCH ON METHODS TO IMPROVE WELL PERFORMANCE

- Cost-benefit analysis of research findings in City of Berlin
- Ground Water Institute in Dresden 2003 (Report on European Rehab Technologies)

10:30 – 10:45 **BREAK**

10:45 – 11:15 Sven Steussloff, Pigadi, GmbH

SUCCESSFUL AND PROVEN APPROACHES TO IMPROVING WELL PERFORMANCE

- Case studies – and their potential application to Mid-Atlantic wells
- Brazil (aquifers in unconsolidated formation and sandstone bedrock)
 - Austria (aquifers in unconsolidated formations)
 - Germany (aquifers in unconsolidated and consolidated formation)

11:15 – 12:15 Neil Mansuy, Subsurface Technologies

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 – 1:15 **LUNCH**

1:15 – 2:15 **PANEL PRESENTATIONS & DISCUSSION**

RICHMOND PANEL

Bruce Capps, Director of the James City County water system
(Invited) representatives from state agencies (VA, NC and WV)

BUCKS COUNTY PANEL

Andrea Bennett, US EPA Region 3
(Invited) representatives from state agencies (PA & NJ)

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

2:15 – 3:15 Bill Varley, Long Island American Water

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

3:15 – 4:00 All presenters (Chair -American Ground Water Trust)

GENERAL DISCUSSION SESSION

4:00 **ADJOURN**