

UNDERSTANDING TODAY'S MEMBRANE TECHNOLOGIES



Courtesy Photos: Pall, GE -Zenon, City of Ft. Myers, City of Chandler

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REGISTER AT
www.dhpseminars.com



Courtesy Photo: Pall

New DHP Seminar... Outstanding Location... Free Day of Training!

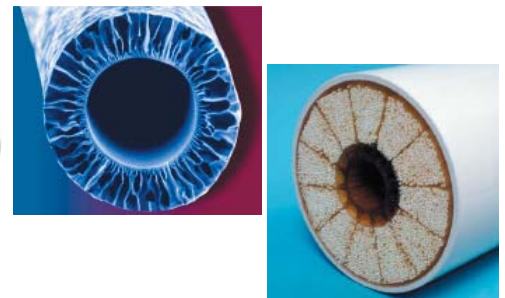
DHP's newest seminar...UTMT...is being presented at the Pall manufacturing plant. For the regular price of a one-day DHP seminar, you receive two-days of training plus tour a manufacturing plant where MF membrane products are produced. This is the first and only time in 2008 that this seminar will be presented. This is an extraordinary opportunity!

Who Should Attend

Anyone wanting to know the latest, UNBIASED information on membrane water treatment technologies (DHP is a training company, NOT an equipment vendor). Anyone wanting to obtain a more advanced understanding of microfiltration/ultrafiltration (Pall expert is teaching the second day). Anyone wanting to see a manufacturing plant where microfiltration units are produced.

Technologies Covered

- Microfiltration (MF)
- Ultrafiltration (UF)
- Nanofiltration (NF)
- Reverse Osmosis (RO)



Courtesy Photos: Dow, Koch Membrane Systems, Norit

Why You Should Attend

Decisions made today affect your design, operation, and budget tomorrow. It's hard to get unbiased information about which membrane product to use and the risks and benefits of different membrane products. As the world's leader in advanced water treatment training, David H. Paul, Inc. has trained and consulted in hundreds of facilities and knows what works and what doesn't. This seminar has been designed to offer you an unbiased, fact-finding, well-rounded experience that will put membrane water treatment in perspective and in a way that is simple to understand. David H. Paul, Inc. has no affiliation with any membrane manufacturers or OEMs.

Membrane water treatment is changing rapidly. Every water treatment professional needs to know the basics of membrane water treatment technologies, especially the unique characteristics of available MF and UF products.

This seminar is presented in an easy-to-understand, step-by-step, interesting and educational format, delivered without a sales pitch and taught by an unbiased industry expert. Return to your facility with the ability to make the right decisions based on what you learned.



Courtesy Photo: Tampa Bay Water

UNDERSTANDING TODAY'S MEMBRANE TECHNOLOGIES

What You'll Receive

- 8 hrs of enjoyable, interesting, easy-to-understand membrane water treatment training
- 8 hrs of the latest in multimedia training including 3-D animations
- A highly illustrated workbook
- Break refreshments



Courtesy Photo: Siemens

Instructors



Day 1 - David Paul will instruct the first day of this training program. David is the author of over 150 published articles on membrane water treatment, has developed and administers a 4,000 page correspondence training program on advanced water treatment, and has created and administers on-campus Associate Degree in Advanced

Water Treatment programs at four different colleges in the United States. David is the President of David H. Paul, Inc. (DHP), an advanced water treatment training and consulting firm located in the USA. DHP has trained over 15,000 water treatment professionals worldwide since 1988.



Day 2 - Anthony M. Wachinski, PhD, PE, is senior vice president and technical director, Pall Corporation.

- 35 years experience in the water and wastewater industry.
- Expert on changing government regulations on water quality and water products.
- Formerly an Associate Professor of Civil Engineering at the United States Air Force Academy.
- Certified as a forensic examiner on water contamination and related issues by the Dept. of Homeland Security.
- Holds numerous patents in water technology.
- Author of Water Treatment (Third Edition), Water Quality (Third Edition), and Ion Exchange Treatment for Water for the AWWA, and more than 40 professional papers.

Overview of Topics

- Dissolved and suspended contaminant removal
- Membrane water treatment overview
- How each technology works and what each can and can't do
- Hollow Fiber Microfiltration & Ultrafiltration
- Spiral Wound Nanofiltration & Reverse Osmosis
 - Brackish Water
 - Seawater

What You'll Learn

Day 1 -

- What you need to know about each membrane technology to make effective, timely decisions
- The ins and outs of the four pressure-driven membrane technologies and which is best for your facility
- The key manufacturers for each technology and how each product works
- Mechanism of fouling and scaling and how to minimize
- Brackish and seawater applications

Day 2 -

- Learn more about membrane solutions from the technology experts.
- Network with other engineering and technology professionals.
- Earn contact hours to help you maintain your PE.



Courtesy Photo: Hydranautic

Certificate of Completion

Each attendee will be e-mailed or mailed a DHP certificate of completion following the course.

What Others Say About DHP Training Seminars

DHP has trained over 15,000 water treatment professionals worldwide since 1988. Trainees include industrial, governmental and drinking water clients. The average rating given by attendees for all DHP seminars, including this one, is over 9 (on a scale of 1-10, with 1 being a terrible rating and 10 being an outstanding rating). The following are typical comments from attendees of this course:

“Most Excellent!”

Mike Milner, V.P. - Alternative H2O Solution

“Excellent... got what I was interested in and more, especially in the inner workings of UF.”

Eric Lozano - Austin Energy

“Excellent! More than I expected. To have an obviously competent technical person be equally talented in teaching/communication is rare.”

Mark Hall - Texas Water Development Board

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Detailed Agendum

Day 1 - Presented by David H. Paul, Inc.

7:45 Refreshments (Provided)

8:00 Introductions

8:15 Water Contaminant Overview

- Contaminants (Dissolved & Suspended)
- The characteristics of contaminants that cause their removal by membrane technologies

Membrane Water Treatment Overview

- Pressure driven membrane technologies
- Membrane configurations (Flat Sheet, Hollow Fiber, Tubular)
- Membrane Elements (Spiral Wound, Hollow Fiber Modules)
- Membrane Element & Module Operation
- Applications for each membrane technology
- Chemicals commonly used for each membrane technology

9:00 Break (Refreshments Provided)

9:15 Microfiltration & Ultrafiltration

- Four reasons for the explosive growth
- Microfiltration membranes
- Ultrafiltration membranes
- Pretreatment options
- Module operation
 - Inside-out configuration
 - Outside-in configuration
 - Pressurized modules
 - Submerged modules
 - Crossflow filtration
 - Dead-end filtration
 - Water flux
 - Trans-membrane pressure
 - Backwash
 - Chemically-enhanced backwash
 - Clean-in-place



Courtesy Photo: Pall

10:15 Break (Refreshments Provided)

10:30 Microfiltration & Ultrafiltration (Continued)

- Step-by-step video presentation of the modules, normal operation and backwash of:
 - Pressurized outside-in modules
 - Submerged outside-in modules
 - Pressurized inside-out modules
 - Integrity testing and fiber breakage repair

Workshop 1: MF & UF

11:30 Lunch (Provided)

12:30 Nanofiltration & Reverse Osmosis

- Brackish water
- Seawater
- Osmosis

12:30 Nanofiltration & Reverse Osmosis (Cont'd)

- Reverse osmosis
- Membranes
- Membrane elements
 - How they work
 - How they're made
 - New large elements
- RO unit design
 - Pressure vessels
 - Crossflow
 - Water flux



Courtesy Photo: Pall

1:45 Break (Refreshments Provided)

2:00 Differences between NF & RO

Workshop 2: NF & RO

3:00 Break (Refreshments Provided)

3:15 Pall Manufacturing Plant Tour

4:30 Summary & Conclusions

- Final Questions & Answers
- Day 1 evaluation

5:00 End

Day 2 - Presented by the Pall Corporation

Membrane Solutions for Regulatory Compliance in Small Communities

This fast-paced free seminar will enhance your knowledge of membrane technology options and the contamination problems they solve. You'll learn about cost-effective, easy to install packaged membrane solutions, and how to select and implement the correct solution.

9:00 Continental Breakfast / Networking

9:30 Welcome and Introduction

- Overview of US Drinking Water Regulations
- Summary of Membrane Technologies
- Low-Pressure Membrane System Operation

LUNCH

- Low-Pressure Membrane Applications
- Process and Installation of Packaged Membrane Systems
- Case Study: Groton, NY

4:00 Seminar Evaluation/Closing



Courtesy Photo: Pall