

Expert Troubleshooting Of Membrane Systems



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Courtesy: Orange County



Tampa Bay Water

WHERE & WHEN

For a list of where and when this seminar is being presented, click [here](#).
This seminar can also be presented at your facility.

DAILY SCHEDULE

8:00 a.m. -11:30 a.m.

Lunch Break

12:30 p.m. -5:00 p.m.

WHO SHOULD ATTEND

This course is a must for anyone wanting to learn the proven, effective troubleshooting techniques used by David Paul when he consults at a reverse osmosis (RO) or nanofiltration (NF) facility experiencing a performance problem.

WHY YOU SHOULD ATTEND

Nearly every RO system experiences performance problems sometime during its operating life. If you've never seen a particular problem before, however, you may not respond quickly enough to solve the problem at an early, reversible stage. David Paul has provided troubleshooting services to over a hundred clients. He has seen many, many different problems. Participating in this seminar provides you with the experience and knowledge of a consultant that has been troubleshooting RO/NF system problems for over 28 years. He teaches you his proven, effective, practical tips and techniques for uncovering even the most complex and multi-faceted problems.

WHAT YOU'LL RECEIVE

8 hours of interesting, easy-to-understand expert troubleshooting training
8 hours of the latest in multimedia training including 3-D animations
A highly illustrated workbook
Break refreshments

INSTRUCTORS



Bill Dees is an Instructor with David H. Paul, Inc. (DHP). Prior to becoming a DHP Instructor, Bill had over 10 years of design, installation, operation, maintenance and troubleshooting experience of water treatment systems including membrane, ion exchange, pretreatment and post-treatment equipment. Bill has 8 years of training experience as a DHP Seminar Instructor and as a Lead Instructor at one of DHP's on-campus, college-based Advanced Water Treatment Programs. Bill holds an Associate of Applied Science Degree in Industrial Water Treatment from San Juan College, DHP's first on-campus program.



David Paul was an operator for 2.5 years, first-level supervisor for 1 year and manager for 8 years of one of the most advanced water treatment systems in the world. He then began David H. Paul, Inc. (DHP) and has trained and consulted since 1988. David is the author of over 130 published articles on advanced 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 three different colleges in the United States. David is the President of DHP, an advanced water treatment training and consulting firm located in Farmington, New Mexico, USA. DHP has trained over 13,000 water treatment professionals worldwide since 1988.

OVERVIEW OF TOPICS

- Process Flows: Pretreatment & RO/NF Unit
- Troubleshooting Tools
- Problems
- Troubleshooting High Permeate Conductivity First stage
- Troubleshooting High Permeate Conductivity
- Troubleshooting High Feed Pressure
- Troubleshooting High Pressure Drop(s)
- Troubleshooting the Requirement for Too Frequent Cleaning
- Troubleshooting the Decreasing Effectiveness of Chemical Cleanings

WHAT YOU'LL LEARN

- How to use over 20 troubleshooting tools
- Expert troubleshooting of:
 - High permeate conductivity
 - High feed pressure
 - High pressure drop(s)
 - The requirement for too frequent cleaning
 - Decreasing effectiveness of chemical cleanings
 - High element replacement rate

DETAILED AGENDA

7:45 Refreshments (Provided)

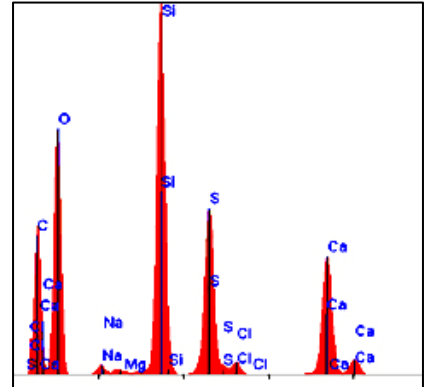
8:00 Introductions

Process Flows: Pretreatment & RO/NF Unit

Workshop 1: Pretreatment & RO/NF Unit

Troubleshooting Tools

- Concentration factor determination
- Specific ion analysis
- Mass balance calculations
- Water flux calculations
- Salt flux calculations
- Crossflow evaluation
- Operating data
- Performance trends
- Design software
- Element autopsy
- Electron Dispersive X-Ray (EDX)
- Fourier Transform Infrared (FTIR)
- Scanning Electron Microscopy (SEM)

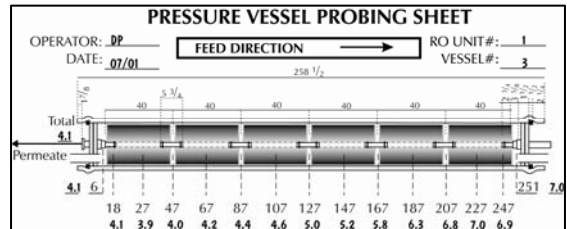


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9:00 Break (Refreshments Provided)

9:15 Troubleshooting Tools (continued)

- Silt Density Index (SDI)
- Chemical Cleaning
- pH, conductivity, oxidation-reduction potential (ORP), temperature, sulfite, chlorine
- Profiling data
- Probing data
- Heterotrophic plate counts
- Iron-related bacteria counts
- Slime-forming bacteria counts
- Sulfate-reducing bacteria counts
- Water analyses
- More

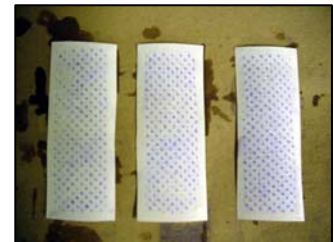


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10:15 Break (Refreshments Provided)

10:30 Problems

- High permeate conductivity
- High feed pressure
- High pressure drop(s)
- Requirement for too frequent cleaning
- Decreasing effectiveness of chemical cleanings
- High element replacement rate



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11:30 Lunch (Not Provided)

12:30 Workshop 2: Problems & Tools
Troubleshooting High Permeate Conductivity

- O-ring leak(s)
- Chemical attack
- Mechanical damage
- Brine seal problem
- Membrane damage
 - Abrasion
 - Pressure
 - Pressure drop
 - Chemical attack
- Manufacturing defects
- Scaling

1:45 Break (Refreshments Provided)

2:00 Troubleshooting High Feed Pressure

- Fouling
 - Organic
 - Bacteria
 - Non-living particles
- Scaling
- Other

Troubleshooting High Pressure Drop(s)

- Fouling
- Scaling
- Other

Troubleshooting Cleaning Issues

- Improper cleaners
- Improper flow rates
- Improper temperatures
- Improper time frame

3:15 Break (Refreshments Provided)

3:30 Troubleshooting Attendees' RO Issues

- Pretreatment
- RO unit designs

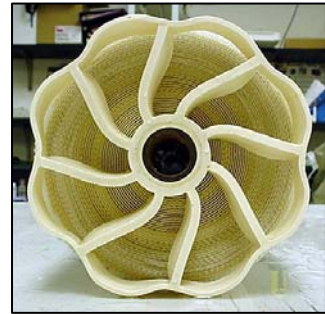
Summary & Conclusions

4:30 Workshop 3: Expert Troubleshooting

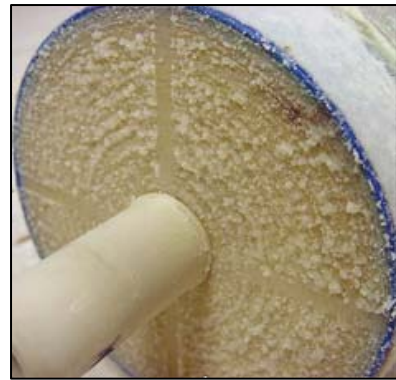
4:45 Final Questions & Answers

Seminar Evaluation

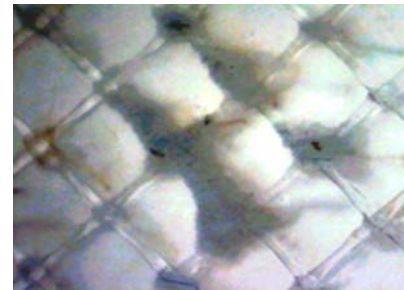
5:00 End



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CERTIFICATE OF COMPLETION

Each attendee will receive a DHP *Certificate of Completion* following the course.

WHAT ATTENDEES SAY ABOUT DHP TRAINING SEMINARS

DHP has trained over 13,000 water treatment professionals worldwide since 1988. Trainees include industrial, governmental and drinking water clients. The average rating given by attendees for all DHP seminars 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 DHP seminars:

“Learned so much my brain hurt.”

Harold (Budji) McDill, System Operator, Monterey Bay Aquarium

“Excellent course material/presentation-lays a solid foundation to build upon. Very high emphasis on students understanding the volume of information given.”

Robert Markle, Boiler Area Leader, Proctor& Gamble

“Course should be required prior to installing & operating RO systems.”

Kim Price, Sr. Plant Engineer, Lucent Technologies

“Excellent info and presentation.”

W.R. Schulz, Manager of Product Development, Isco Industries

“Very good course, even if you have some background in RO.”

Kevin Simmons, Mechanical Project Engineer, US Filter (Siemens)

“Excellent! Very helpful.”

Stan Brooks, President, MoBetta Water Inc.

“Great! Workshops really helped on my troubleshooting skills.”

Gerald Lands, Operator, Duke Energy

“Great seminar! Came in knowing very little about reverse osmosis, left with a good understanding of RO and RO units.”

Chris Greer, Technical Sales Rep., Ashland Specialty Chemical

“This class was extremely enlightening even for someone with RO experience.”

Lionel Fontes, Chemist, SRP

“Great course- I would recommend this course to everyone in this field of work.”

Mike Wilkey, UPW/IWS Tech., Intel-Colorado Springs

“The flow and concentration of information was excellent.”

Joe Turner, Plant Utility Operator, Amgen-Longmont

“Very informative, very in depth, and very helpful.”

Martin Wix, Instrument Tech., BOC Gases