

# Reverse Osmosis Chemical Cleaning

## Hands-On



Copyright © 2006 David H. Paul, Inc. Copyright © 2006 David H. Paul, Inc. Copyright © 2006 David H. Paul, Inc.

### 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 seminar provides valuable knowledge to technicians currently performing chemical cleanings, technicians considering implementing chemical cleanings at their facility and management and engineering personnel who want to understand and better track the effectiveness of cleanings being performed others, including by outsourced contractors.

### WHY YOU SHOULD ATTEND

Chemically cleaning reverse osmosis (RO) and nanofiltration (NF) units can be expensive, time-consuming, frustrating and all too frequently ineffective. Are you cleaning more and more frequently with decreasing or minimal improvement? Are you getting less than 3-5 years of life from your elements? In this seminar you'll learn the most successful and least expensive ways to clean RO/NF units by actually cleaning scaled and fouled RO units. This is the most effective way to learn how to identify problems, increase membrane life, and save your facility time and money. The information, tips and techniques you'll learn in this seminar are practical and immediately usable to improve the performance of your system(s).

### WHAT YOU'LL RECEIVE

8 hours of interesting, easy-to-understand classroom and hands-on RO/NF training

A comprehensive workbook packed with procedures, datasheets and techniques

**Personal attention!** DHP hands-on seminars are limited to a maximum of 6 attendees

Break refreshments and lunch

## INSTRUCTORS



Jason Turner  
Plant City, FL



Ed Turner  
San Antonio, TX



Robert Decker  
Farmington, NM



Bill Dees  
Farmington, NM



Alan Lane  
Yuma, AZ

Every instructor for the hands-on seminars is/was an instructor at one of DHP's on-campus Associate Degree in Advanced Water Treatment programs. The hands-on seminars are held at DHP's Farmington, NM facility or at one of three college-program location using the same equipment, labs, instruments and training aids as our college students. Each DHP college instructor is a graduate of the four-semester Advanced Water Treatment Program. You won't find anyone more dedicated to students and more excited about water treatment than DHP instructors. DHP instructors have trained over 13,000 water treatment professionals worldwide since 1988.

## OVERVIEW OF HANDS-ON TRAINING

- Good cleaning system equipment and design
- Choose the right chemical(s)
- Learn DHP's proven 15-step cleaning procedure
- Clean scaled units
- Clean fouled units
- Troubleshoot common cleaning problems
- Neutralization of used cleaning chemicals

## WHAT YOU'LL LEARN

- When to chemically clean
- How to effectively clean
- How to effectively monitor cleanings
- When to stop cleaning
- How to objectively measure the results of a cleaning
- How to use recommended cleaning sheets and proven procedures
- Troubleshooting techniques for chemical cleanings
- The unique reasons why your chemical cleanings may not be effective



Copyright © 2006 David H. Paul, Inc.

## DETAILED AGENDA

### Morning:

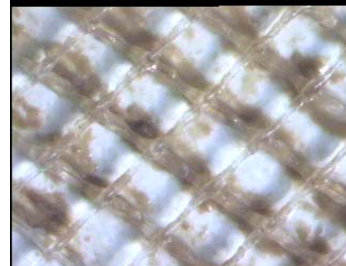
- 7:45 Refreshments (Provided)
- 8:00 Introductions
- Safety in the hands-on areas
  - RO Unit Chemical cleaning pre-test
  - Basic cleaner determination
  - Preparing a cleaning solution
- 9:15 Break (Refreshments Provided)
- 9:30 Preparing the RO units for operation (4" and 8")
- Four- and eight-inch RO unit walk down
  - Hand-held conductivity and pH meter calibration
  - Pretreatment skid start-up
- RO unit start-up
- Pre-cleaning data collection
  - Shutdown
- 10:30 Break (Refreshments Provided)
- 10:45 Cleaning overview on live equipment
- Cleaning equipment review
  - Cleaning data review
  - Cleaning procedures review
- 11:00 Clean the 8" RO unit (low pH)
- 12:00 Lunch (Provided)



Copyright © 2006 David H. Paul, Inc



Copyright © 2006 David H. Paul, Inc



Copyright © 2006 David H. Paul, Inc

### Afternoon:

- 1:00 Continue cleaning the 8" RO unit (low pH)
- 2:00 Break (Refreshments Provided)
- 2:15 Clean the 4" RO unit (high pH)
- 3:15 Break (Refreshments Provided)
- 3:30 Continue cleaning the 4" RO unit (high pH)
- 4:30 Discussion, questions & Answers
- RO Unit chemical cleaning post-test
- 5:00 End

## CERTIFICATE OF COMPLETION

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

### WHAT OTHERS SAY ABOUT DHP HANDS-ON 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 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:

“I enjoyed the class very much and would highly recommend it to anyone in the industry.”  
Janet Drozda, Operator, Intel

“Outstanding course. Best training program that I have attended  
in the water treatment industry!”  
George James, Reaction Engineering, Inc.

“Instructor was very knowledgeable and thorough. Course will have large  
impact on our cleaning procedure.”  
John Paul Robb, Plant Engineer, Trigen Colorado Energy

“Excellent Course! The hands on portion served very well in firming up the concepts and increasing  
retention. Level of instruction was good balance of theory and practical...well presented.”  
Finley Jones, Sr. Account Manager, Nalco

“Probably the best hands-on course I’ve had in my 10 years as a technician.”  
Andy Gutierrez, Technician, Amgen

“Hands-on experience was a valuable experience.”  
Melody Martin, Plant Chemist, Oklahoma Gas & Electric

“I thought I knew a good amount about RO systems. After taking this course I realized how little I  
actually did know.”  
Chris Corsetti, Facilities Engineering Supervisor, Genzyme Corp.

“Excellent instructors. I should have taken this course ten years ago. I could have saved the company  
thousands of dollars and weeks of time.”  
Charles Hagen, Lab supervisor. Ameradahess

“DHP training took me from having no idea what RO is to being a confident and knowledgeable RO  
decision maker.”  
Kenneth Gaskill, Maintenance Supervisor, Warner Lambert Co.

“Great course, great teachers, great equipment. I liked the use of multimedia...videos, illustrations,  
computers, etc.”  
Evan Francis, Operator, Monterey Bay Aquarium