



# Operation, Control Monitoring & Maintenance of RO Systems Hands-On **Classroom & Hands-On Training**

**3-Day seminar**



## Information Packet

### Seminar Cost

- \$3,999 USD
  - Price includes
    - Classroom & hands-on training
    - Refreshments & lunch
    - Certificate
    - Certification administration, pin, sticker (if you're taking this seminar for certification)
    - Equipment usage
    - Analytical equipment, lab ware, chemicals, etc.
    - Small class size
      - Limited to 8 attendees
      - One-on-one attention
    - Unbiased training
      - DHP doesn't sell chemicals or equipment
  - Discounts may apply
    - "Early Bird" (10% 30 days prior, 15% 45 days prior)
    - Other

### Seminar Length

- Three days
- 9 hours per day (8 a.m. to 5:00 p.m.)
  - Four 10-15 minute breaks during the day
  - 30-45 minutes for lunch

### Seminar Description

This seminar consists of three days of classroom and hands-on training covering proper operation, control, monitoring and troubleshooting of RO systems. This is essential information for anyone who works with, designs, services, installs, operates, maintains and/or troubleshoots RO systems.

This is a Level 2 seminar. While some Level 1 information is provided as a review, all topics are taken to a higher level in this seminar.

During this seminar you will learn how to effectively:

- Evaluate the pretreatment
- Understand the operation of an RO unit
- Load/unload membrane elements
- Monitor an RO unit
- Troubleshoot an RO unit



**Classroom and hands-on topics include:**

- RO Water Treatment Overview
- Water Contaminants Overview
- Semipermeable Membranes
- Membrane Rejection
- Osmosis & Reverse Osmosis
  - Osmotic pressure
  - Applied pressure
  - Net Driving Pressure
  - Water flux
  - Salt passage
- Membrane Elements
- Pressure Vessels
- RO Units
- RO Unit Operation
- Recovery rate
- Concentration factor
- What happens from first inch/cm to the last in RO units
- Potential Problems
- Pretreatment
  - Scaling Control
  - Fouling Control
  - Chemical Attack Control
- Daily Monitoring
- Weekly Trending
  - Normalized Permeate Flow
  - Pressure drops
  - Normalized Salt Passage
- Piping and Instrumentation of RO Systems
- Silt Density Index (SDI) measurements
- Unloading & loading elements
- RO Unit Monitoring
- RO Unit Trending
- Obtain analytical data and check the calibration of on-line instruments
- Profiling
- Probing



## DHP's Training Methodology

DHP uses the consulting services of a Doctor of Education from Columbia University (Dr. Linda Paul) in the development of its training seminars. DHP's training methodology includes:

- Short, interesting, interactive lecture sessions using:
  - Power Point™ slides
  - Video clips
  - Animations
- Group exercises to enhance understanding and retention
- Workshops to further enhance understanding and retention
- Optional daily open-book Knowledge Verification Exam to document what was learned

A *Knowledge Verification Exam* and hands-on *Proficiency Verifications* are given each day. Don't worry...you'll pass. Since 1988, DHP has been training water treatment personnel like you. We take you step-by-step through the **knowledge and proficiencies needed to properly monitor, operate and control an RO system plus some basic maintenance and troubleshooting**. All exams are open book because nobody remembers everything for the rest of their lives...but you'll know in the future where to get the information you need in the book.

We provide a lot of repetition so that you will have no problem getting good scores. **For example, to make sure that you know how to properly perform an SDI measurement, we:**

1. First, go over the information in a Power Point™ format.
2. Second, go over the information in a video format.
3. Third, have you perform an SDI measurement with an Instructor present
4. Fourth, have a workshop on the topic, which is really just a practice exam for the Knowledge Verification Exam at the end of the day. All workshops are performed in groups to aid in the learning experience. There will be no surprises on the daily Knowledge Verification Exams. You will have previously seen and answered similar questions in the workshops.

**NOTE: Knowledge Verification Exams are optional. If you don't want to be certified, you don't have to take the exams.**



### Who Should Attend

Everyone who works with, or will work with, the reverse osmosis and pretreatment technologies in operating plants needs to know the tips, techniques and proficiencies taught in this seminar, including:

- Operators
- Maintenance personnel
- I & C Technicians
- Supervisors/Managers
- Engineers
- Original Equipment Manufacturers
- Service technicians
- More

### Why You Should Attend

#### From a Personal Standpoint

- After successfully completing this 3-day program **you will be in the top 1% of RO personnel in the world** in your level of understanding and proficiency
- If desired, you can add **Reverse Osmosis Specialist II** to your title and bio
- Puts you in a better position for job advancement
- You can't get this information anywhere else
- The instructor has decades of practical RO water treatment experience
- The instructor is an RO water treatment consultant
- The instructor is a professional trainer
- The seminar covers the material in a step-by-step manner so that everyone will understand the concepts presented
- The presentation uses a multimedia format, with many videos and animations provided

#### From an Employer's Standpoint

- Trained employees save you money by:
  - Having the knowledge needed to identify problems at an early stage
  - Having the ability to troubleshoot even difficult problems many RO systems face
  - Using this knowledge to correct problems
  - Less down time of the RO system
  - Increased system reliability
- Being able to show clients, customers and any applicable governmental agencies that your employees have been independently certified on their knowledge and proficiencies



### **What You'll Receive**

- 24 hours of interesting, easy-to-understand training
- Highly illustrated workbook
- Break refreshments and lunch
- Personal attention: Questions & Comments are encouraged



## Instructor Biography



Dick Youmans, BBA, CWT, ROS IV  
VP of On-Site Sales / Instructor

**Richard (Dick) Youmans** is the VP of On-Site Sales / Instructor for David H. Paul, Inc. (DHP). Since 1977, Dick has been involved in just about every aspect of industrial water treatment with most of those years specializing in reverse osmosis chemical applications, training and troubleshooting. Like all DHP instructor / consultants, he has been in hundreds of water treatment plants covering every major industry. Dick earned a BBA degree from the University of Georgia in 1974 and an Associate of Applied Science Degree in Industrial Water Treatment from San Juan College and David H. Paul, Inc. in 2002.



Steve Siversns, ROS IV  
Instructor / Consultant

**Steve Siversns** is an instructor and consultant for David H. Paul Inc. (DHP). Steve has over 35 years' experience focused on designing and troubleshooting water treatment processes. He specializes in high purity industrial water treatment and has experience with desalination, water recovery, and waste treatment. Steve is a Professional Engineer (P.Eng.) registered in the province of Ontario, Canada. He received his B.Eng. (1980) and M. Eng. (1984) in Chemical Engineering both from McMaster University.



## Certificate of Completion

Each attendee will receive a DHP certificate of completion following the course.

## DHP Training Seminars

DHP has trained **over 20,000 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).

## Testimonials

The following are typical comments from attendees of DHP seminars:

I really liked the hands-on exercises of tracing P&ID diagrams.

**Jeffrey Jones**

Fantastic training. Enjoyed the handson and even classroom part. I will be looking into taking more DHP training and

**Megan Gusman**

Loved the hands-on, I can't stress that enough.

**Travis Tandal**

Excellent seminar, very clear instructor...

**Alicia Arrigoni**

...Learned more in 2 days than in the last few years...

**Jeff Roster**

Great presentation.

**Richard Faye**

Great training, had fun.

**Brendan Hukka**

Another great day of hands-on.

**Mark Baty**

**YOSHIKAWA KEI**

Helped fill in gaps to other training I received.

**Bryce Yoder**

highly recommend!