

INSTRUMENTATION, CONTROL AND MAINTENANCE OF RO/NF SYSTEMS



David H. Paul, Inc.

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Courtesy Photos: DHP, Inc.

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REGISTER AT

www.dhpseminars.com

HANDS ON

What Every Service Tech, Engineer and I&C/Maintenance Person Must Know and Do to Minimize the Cost of RO Water Treatment

Where and When

This extraordinary hands-on seminar will be presented at the Siemens Water Technologies' (SWT's) manufacturing plant in beautiful Colorado Springs June 16-18, 2009.

NOTE: This is NOT a sales-pitch seminar. DHP is holding this seminar at this location because SWT is willing to provide training rooms, RO equipment from 500 gpd to 500+ gpm, a complete RO water treatment system on which hands-on training may occur as well as detailed knowledge of instrumentation, controls, RO design, etc.

Daily Schedule

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

Lunch Break

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

Who Should Attend

Service Techs, Startup Personnel, Plant Maintenance Personnel, Design Engineers, Plant Engineers, Design Engineers, Lead Operators/Supervisors, Others

Why You Should Attend

These are tough economic times. Your budget for training seminars may have been cut. Is your company "hoping" that nothing goes wrong with your RO water treatment system? Can you afford more equipment downtime, increased chemical cleanings, higher electricity bills, early membrane replacement and higher downstream polishing expenses? This HANDS-ON seminar provides you with real-world, practical training on what you must know and do to maintain RO systems at the lowest cost. There is a maximum of 24 attendees for this seminar. Four groups of no more than six trainees each will train and work with different equipment.



Courtesy Photos: City of Chandler

What You'll Receive

- 24 hours of practical, easy-to-learn hands-on training
- A highly illustrated workbook
- Break refreshments (lunch included)

INSTRUMENTATION, CONTROL AND MAINTENANCE OF RO/NF SYSTEMS

Classroom Instructor



David Paul 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 16,000 water treatment professionals worldwide since 1988.

Hands-On Instructors



Siemens Water Technologies (SWT)

This training program is presented at SWT's manufacturing plant in Colorado Springs. SWT manufactures RO, NF, MF, UF, EDI, MMF and many other skids at this location. SWT will provide several experts to instruct the hands-on portions of the training. SWT experts will include:

- Equipment setup experts
- Instrumentation setup experts
- PLC and HMI experts
- Equipment design and manufacture experts
- More



Hach

One or more Hach experts will provide instruction on the setup and maintenance of off-line instruments used to effectively operate RO and pretreatment systems. Instruments include pH, conductivity, ORP, chlorine, sulfite and more.



Georg Fischer Signet

One or more Georg Fischer Signet experts will provide instruction on the setup and maintenance of on-line instruments used to effectively operate RO and pretreatment systems. Instruments include pH, conductivity, ORP, chlorine, flow, pressure and more.



Grundfos

One or more Grundfos pump experts will provide instruction on the setup and maintenance of a Grundfos RO high pressure pump. The instruction will include the breakdown and reassembly of the pump.

Daily Schedule

The first session of each day will be spent in a training room where the DHP instructor will provide the information needed to prepare attendees to understand and perform the activities that will be covered in the hands-on portion of the training. Following this, attendees will be divided into four groups and each group assigned a rotation through four hands-on activities (see Detailed Agenda below). The remainder of each day will be spent in the plant being trained by Siemens', Hach, Grundfos and Signet experts on the topics listed below. Again, there will be NO sales pitch. This is an unprecedented opportunity to receive practical, performance-enhancing training from a team of experts that know how to train.



Courtesy Photo: City of Wichita Falls

INSTRUMENTATION, CONTROL AND MAINTENANCE OF RO/NF SYSTEMS

Overview of Hands-On Topics

- Instrumentation setup
- Microprocessor-based controller setup
- Setting up small to large multimedia filters
- Calibration and maintenance of instruments
- Element loading and shimming
- Local control through Human-Machine Interface (HMI)
- Remote control through SCADA
- Using software to compare design versus actual performance
- Changing PLC parameters
- VFD-controlled pumps
- Preventive maintenance
- RO high pressure pump maintenance



Courtesy Photo: SWT

What You'll Learn

You'll learn practical tips and techniques necessary to minimize RO unit costs by excellently monitoring, maintaining and controlling your pretreatment system and RO system. Design engineers will learn the real-world activities that plant personnel encounter and how a better design can result in lower O & M costs.

Certificate of Completion

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



Courtesy Photos: Orange County Water District and Hach



Courtesy Photos: Siemens Water Technologies

INSTRUMENTATION, CONTROL AND MAINTENANCE OF RO/NF SYSTEMS

What Others Say About DHP Training Seminars

DHP has trained over 16,000 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 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

INSTRUMENTATION, CONTROL AND MAINTENANCE OF RO/NF SYSTEMS

Detailed Agenda

Day 1: Setting up RO/NF Units for Optimal Performance

7:45 Refreshments (Provided)

8:00 Classroom Training

- Introductions
- Overview of RO/NF water treatment
 - Standard designs
 - Alternative designs
 - Normal RO unit operation
- Potential RO Unit Problems
 - Scaling, Fouling & Chemical Attack
- Instrumentation needed to properly monitor an RO/NF unit
- Pretreatment to minimize scaling, fouling, chemical attack



Courtesy: RAWEC

9:30 Break (Refreshments Provided)

9:45 Hands-On Training

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
ACTIVITY	Setting up small to large media filters	Loading RO elements & shimming	Setting up the instrumentation on an RO unit	Setting up a microprocessor-based controller for an RO unit

11:15 Lunch (Provided)

11:45 Hands-On Training

	GROUP 4	GROUP 1	GROUP 2	GROUP 3
ACTIVITY	Setting up small to large media filters	Loading RO elements & shimming	Setting up the instrumentation on an RO unit	Setting up a microprocessor-based controller for an RO unit

1:15 Break (Refreshments Provided)

1:30 Hands-On Training

	GROUP 3	GROUP 4	GROUP 1	GROUP 2
ACTIVITY	Setting up small to large media filters	Loading RO elements & shimming	Setting up the instrumentation on an RO unit	Setting up a microprocessor-based controller for an RO unit

3:00 Break (Refreshments Provided)

3:15 Hands-On Training

	GROUP 2	GROUP 3	GROUP 4	GROUP 1
ACTIVITY	Setting up small to large media filters	Loading RO elements & shimming	Setting up the instrumentation on an RO unit	Setting up a microprocessor-based controller for an RO unit

4:45 Daily Summary & Conclusions

- Final Questions & Answers
- Daily evaluation

5:00 End

INSTRUMENTATION, CONTROL AND MAINTENANCE OF RO/NF SYSTEMS

Detailed Agenda

Day 2: Startup, Operation, Troubleshooting & Control

7:45 Refreshments (Provided)

8:00 Classroom Training

- How to read P & IDs

9:30 Break (Refreshments Provided)

9:45 Hands-On Training

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
ACTIVITY	Human-Machine Interface (HMI) & control	Remote-SCADA control	P & ID reading, startup & data collection-RO 1	P & ID reading, startup & data collection- RO 2

11:15 Lunch (Provided)

11:45 Hands-On Training

	GROUP 4	GROUP 1	GROUP 2	GROUP 3
ACTIVITY	Human-Machine Interface (HMI) & control	Remote-SCADA control	P & ID reading, startup & data collection-RO 1	P & ID reading, startup & data collection- RO 2

1:15 Break (Refreshments Provided)

1:30 Hands-On Training

	GROUP 3	GROUP 4	GROUP 1	GROUP 2
ACTIVITY	Human-Machine Interface (HMI) & control	Remote-SCADA control	P & ID reading, startup & data collection-RO 1	P & ID reading, startup & data collection- RO 2

3:00 Break (Refreshments Provided)

3:15 Hands-On Training

	GROUP 2	GROUP 3	GROUP 4	GROUP 1
ACTIVITY	Human-Machine Interface (HMI) & control	Remote-SCADA control	P & ID reading, startup & data collection-RO 1	P & ID reading, startup & data collection- RO 2

4:45 Daily Summary & Conclusions

- Final Questions & Answers
- Daily evaluation

5:00 End



Courtesy: City of Wichita Falls

INSTRUMENTATION, CONTROL AND MAINTENANCE OF RO/NF SYSTEMS

Detailed Agenda

Day 3: RO/NF Unit Monitoring, Troubleshooting & Maintenance

7:45 Refreshments (Provided)

8:00 Classroom Training

- On-line instruments required & purpose
- Off-line instruments required & purpose
- Monitoring performance
- Troubleshooting performance graphs
 - Using software programs



9:30 Break (Refreshments Provided)

9:45 Hands-On Training

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
ACTIVITY	Maintenance of off-line instruments	RO Unit Preventive maintenance procedures	Maintenance of on-line instruments	High Pressure Pump teardown & maintenance

11:15 Lunch (Provided)

11:45 Hands-On Training

	GROUP 4	GROUP 1	GROUP 2	GROUP 3
ACTIVITY	Maintenance of off-line instruments	RO Unit Preventive maintenance procedures	Maintenance of on-line instruments	High Pressure Pump teardown & maintenance

1:15 Break (Refreshments Provided)

1:30 Hands-On Training

	GROUP 3	GROUP 4	GROUP 1	GROUP 2
ACTIVITY	Maintenance of off-line instruments	RO Unit Preventive maintenance procedures	Maintenance of on-line instruments	High Pressure Pump teardown & maintenance

3:00 Break (Refreshments Provided)

3:15 Hands-On Training

	GROUP 2	GROUP 3	GROUP 4	GROUP 1
ACTIVITY	Maintenance of off-line instruments	RO Unit Preventive maintenance procedures	Maintenance of on-line instruments	High Pressure Pump teardown & maintenance

4:45 Daily Summary & Conclusions

- Final Questions & Answers
- Daily evaluation

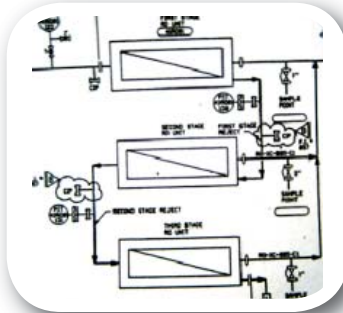
5:00 End

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Detailed Breakdown HANDS-ON TRAINING



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Using a P&ID



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Day 1: Hands-On Activities

Setting up small to large media filters

- Discussion of proper loading techniques
- Valves
- Instruments
- More

Loading RO elements & shimmiing

- Proper technique for unloading elements
- Proper technique for loading elements
- Proper technique for shimmiing elements
- More

Setting up an RO unit

- Instrumentation
- Valves
- Pump
- More

Setting up a microprocessor-based controller

- Proper technique
- Proper checks
- Tips
- More

Day 2: Hands-On Activities

Human-Machine Interface (HMI) & control

- How to use each screen
- How to control equipment using an HMI
- How to change setpoints
- More

Remote-SCADA control

- How to use each screen
- How to control equipment using an HMI
- How to change setpoints
- More

P & ID reading, startup & data collection-RO 1

- Using a Piping & Instrumentation Drawing (P & ID), trace all components of RO 1
- Startup the RO unit
- Collect & record required data
- More

P & ID reading, startup & data collection- RO 2

- Using a P & ID, trace all components of RO 2
- Startup the RO unit
- Collect & record required data
- More

Day 3: Hands-On Activities

Maintenance of off-line instruments

- pH, conductivity & ORP
- Turbidity
- Chlorine
- More

RO unit preventive maintenance procedures

- Instrumentation
- Pumps & Motors
- Pressure Vessel Internals
- More

Maintenance of on-line instruments

- pH, conductivity & ORP
- Flow
- Pressure
- More

High Pressure Pump teardown & maintenance

- Preventive maintenance
- Pump teardown
- Pump rebuild
- More