



Texas Commission on Environmental Quality

July 2016

Reverse Osmosis/Nanofiltration Operator Training

Curriculum Guidance for Required Training

In response to rule changes in Title 30 of the Texas Administrative Code (30 TAC) Chapter 290, reverse osmosis (RO) or nanofiltration (NF) membrane systems must have operators that have successfully completed at least one approved training course or event specific to the operations and maintenance (O & M) of reverse osmosis or nanofiltration membrane treatment (see 30 TAC §290.46(e)(2)(D)). The goal of this requirement is to provide the operator with knowledge and skills to help them effectively operate and maintain their membrane water system.

This curriculum guidance is designed to enable training providers to develop approved training complying with the rule requirement. The training must include relevant topics needed to provide operators knowledge and skills specifically related to the O & M of their RO or NF public water system. *Training shall not show any preference to, or promote any specific manufacturer's product or service.* The training provider must submit an application for training approval per TCEQ's regulatory guidance, RG-373: *Approval of Training for Occupational Licensing*, available online at www.tceq.texas.gov/publications/rg/rg-373.html.

The minimum length of the training shall be 8 hours to include the minimum criteria specified in this document. If the approved training course or event is less than 8 hours, the operator can complete multiple approved courses or events to fulfill the 8 hour minimum requirement. If the training is longer than 8 hours, the student must "successfully complete" the training which may include performance assessments or attending and participating throughout the entire course.

This document also provides a list of currently approved training that can be used to fulfill the training requirement. If the list includes an approved course completed by the operator prior to the rule change, this course will meet the current training requirement. The training will be reflected on the operator's training record which is available on the TCEQ Occupational Licensing web page at www.tceq.texas.gov/licensing from the *Search License Information* link.

Minimum Criteria for RO or NF Operation & Maintenance Training

For the purpose of operator training, a single TCEQ-approved 8-hour course will satisfy the requirements of 30 TAC §290.46(e)(2)(D) provided the TCEQ has determined the proposed course has significant emphasis on unit operations and maintenance. To satisfy this requirement, the TCEQ-approved 8-hour course **must** include:

- I. Unit Operation
 - A. Parameters to monitor (ex., conductivity, flow, pressure, normalized permeate flow, temperature, etc.)
 - B. Instrumentation
 - C. Interpreting data
 - D. Troubleshooting
 1. Increased salt passage, pressure drop, increased permeate flow rate
 2. Leaks (ex., o-rings)

- II. Chemical Cleaning of RO/NF Units
 - A. When is it needed?
 - B. Chemicals and processes for removing scale and foulants
 - C. Equipment required

In addition to the minimum required criteria outlined above, the TCEQ recommends that RO/NF system operators also receive training in the following areas. Although recommended by the TCEQ, the following criteria are not required to satisfy 30 TAC §290.46(e)(2)(D):

- I. Osmosis & Reverse Osmosis
 - A. What is it, how does it work, and what does it treat?
 - B. Types of elements or modules (spiral wound, tubes, flat sheets)
 - C. Configuration of RO/NF systems (arrays, stages, and passes)
- II. Pretreatment to Minimize Problems
 - A. Scaling and fouling
 - B. Chlorine removal
 - C. Iron removal
- III. Post-treatment or Remineralization

Background, terminology, membrane theory, water chemistry, historical information, or other related ancillary topics may be necessary to understand the topics listed above, but are not included in the minimum criteria.

RO or Nanofiltration Membrane System O & M Approved Training List

Effective September 1, 2016, reverse osmosis or nanofiltration membrane systems must have operators that have successfully completed at least one TCEQ-approved training course or event specific to the operations and maintenance of reverse osmosis or nanofiltration membrane treatment. Operators must successfully complete at least 8 hours of approved training.

The TCEQ has determined that each of the courses below has sufficient emphasis on RO or NF unit operations and maintenance and when completed fulfills this training requirement. Other courses shall be listed as they are approved:

- David H. Paul (Provider #0456):
 1. INWT 147 RO Troubleshooting—correspondence 40 hours (TCEQ course #0909)
 2. INWT 257 Advanced RO Monitoring/Cleaning—correspondence 40 hours (TCEQ course #0912)
- South Central Membrane Association (SCMA-Provider #0269):
 1. 8-hour workshops at various locations in Texas (TCEQ course #1342);
See <http://www.scmembrane.org/calendar/> for further information.

Other courses will be approved provided course content covers topics in accordance with the minimum criteria outlined in this guidance.

Additional information on approved providers of the courses in the above list can be found at the following TCEQ website: www.tceq.texas.gov/licensing. Select the Training/Continuing Education Courses link on the Occupational Licensing page and then select Water Operator.

For further information, contact the TCEQ Occupational Licensing Section at (512) 239-6300.