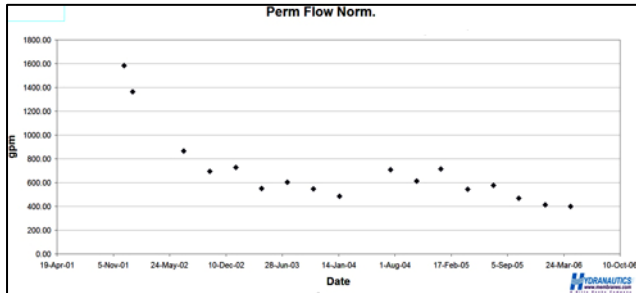
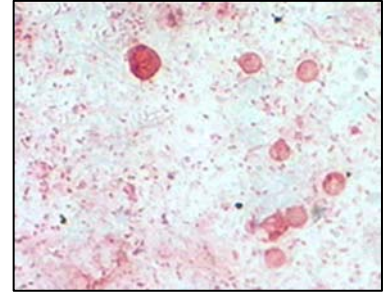


# Reverse Osmosis Water Treatment Specialist Program



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## Reverse Osmosis Water Treatment Course 1

### Math, Chemistry, Biology

1. Whole Numbers, Fractions, Decimals
2. Scientific Notation & Significant Figures
3. Addition & Subtraction
4. Multiplication & Division
5. Solving Equations

#### Sectional Exam

6. Atoms & Molecules
7. Atomic & Molecular Bonds
8. Properties of Water
9. Dissolved Substances: Ions
10. Dissolved Substances: Other
11. Dissolved Substances: Measurement

#### Sectional Exam

12. Suspended Substances: Nonliving Particles
13. Suspended Substances: Microorganisms
14. Suspended Substances: Measurement

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Courtesy: TX Independent Energy



Courtesy: Tampa Bay Water

## Reverse Osmosis Water Treatment Course 2

### Reverse Osmosis

- 15. Pretreatment: Overview
- 16. Particulate Control: Overview
- 17. Microbial Control: Overview
- 18. Scale Control: Overview

#### Sectional Exam

- 19. Reverse Osmosis: Theory Of Osmosis
- 20. Reverse Osmosis: Theory Of Osmosis
- 21. Reverse Osmosis: Reversing Osmosis
- 22. Semipermeable Membranes: What Are They?
- 23. Cellulose Acetate & Thin Film Membranes

#### Sectional Exam

- 24. Membrane Performance: Water & Salt Flux
- 25. Membrane Performance: What Gets Rejected
- 26. Membrane Elements: Construction
- 27. Membrane Elements: Characteristics
- 28. Reverse Osmosis Unit: Equipment
- 29. Reverse Osmosis Unit: Design Criteria
- 30. Reverse Osmosis Unit: Unit Operation

#### Sectional Exam

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## Reverse Osmosis Water Treatment Course 3

### RO Troubleshooting/Cleaning

- 31. Problems: Overview
- 32. Problems: Biofouling I
- 33. Problems: Biofouling II
- 34. Monitoring: Pressures, Flows, Conductivities
- 35. Monitoring: Instrumentation Calibration & Pressure Drops
- 36. % Salt Rejection & Normalized Permeate Flow
- 37. Silt Density Index

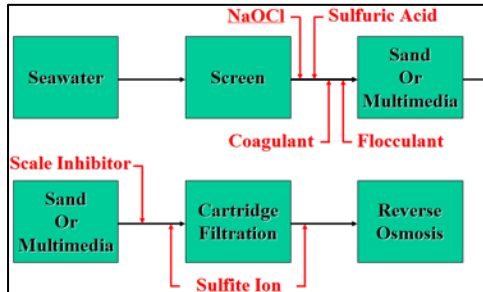
#### Sectional Exam

- 38. Troubleshooting: Profiling & Probing
- 39. Troubleshooting: Normalized Permeate Flow
- 40. Troubleshooting: Salt Rejection & Pressures
- 41. Chemical Cleaning: Overview
- 42. Chemical Cleaning: Process
- 43. Troubleshooting: Chemical Cleaning

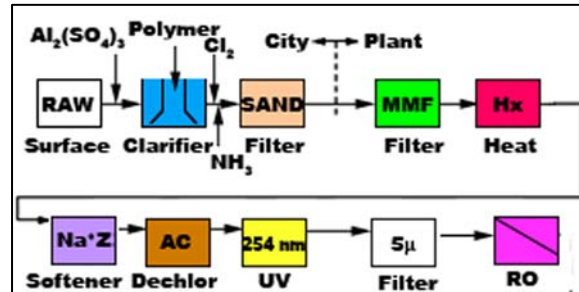
#### Sectional Exam

#### Final Exam

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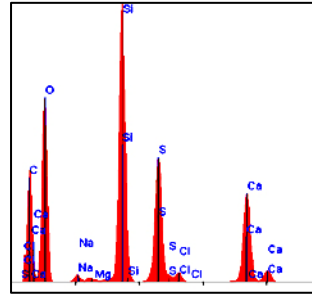
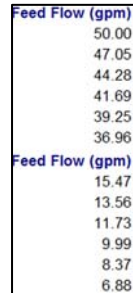
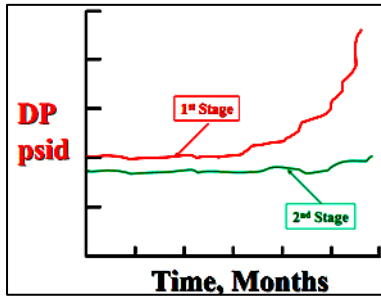
## Advanced Reverse Osmosis Water Treatment Course 1

### Pretreatment Troubleshooting

1. Introduction to Advanced Pretreatment Troubleshooting
2. Multimedia Filtration I
3. Multimedia Filtration II
4. Multimedia Filtration III
5. Activated Carbon I
6. Activated Carbon II
7. Activated Carbon III
8. pH
9. Temperature
10. Scale Inhibitors & Silt Dispersants
11. Fouling Potential: I
12. Fouling Potential: II
13. Dechlorination With Sulfite Compounds

### Sectional Exam

# Reverse Osmosis Water Treatment Specialist Program



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## Advanced Reverse Osmosis Water Treatment Course 2

### Scaling & Fouling Troubleshooting

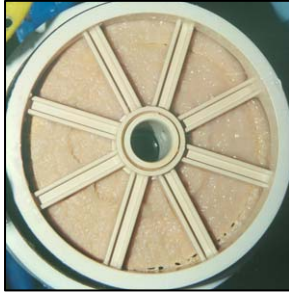
14. Introduction to Advanced RO Troubleshooting
15. Water Analysis: Analytical Methods I
16. Water Analysis: Analytical Methods II
17. Water Analysis: Equivalents
18. Water Analysis: Hardness
19. Water Analysis: Alkalinity
20. Water Analysis: Ionic Strength

#### Sectional Exam

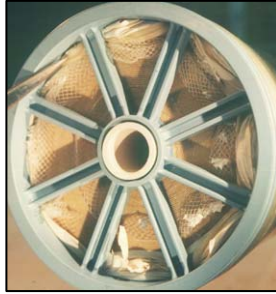
21. Calcium Carbonate Scale: Saturation Index
22. Sulfate Scales: Solubility Products
23. Iron & Sulfur Fouling
24. Silica Scaling & Fouling
25. Scale Inhibitor & Dispersant Dosages
26. Acid Dosage
27. Recovery Limitation
28. Scale Control Software I
29. Scale Control Software II

#### Sectional Exam

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## Advanced Reverse Osmosis Water Treatment Course 3

### Advanced RO Monitoring/Cleaning

- 30. RO Design Parameters I
- 31. RO Design Parameters II
- 32. RO Monitoring Software I
- 33. RO Monitoring Software II
- 34. Replacing Elements I
- 35. Replacing Elements II

#### Sectional Exam

- 36. Chemical Cleaning: Scalants
- 37. Chemical Cleaning: Foulants
- 38. Chemical Cleaning: Problems
- 39. Chemical Cleaning: Procedures
- 40. Chemical Cleaning: Analysis
- 41. Chemical Cleaning: Disinfectants
- 42. Membrane Damage
- 43. Element Autopsy I
- 44. Element Autopsy II

#### Sectional Exam

#### Final Exam