

Reverse Osmosis Specialist Certification

Handbook

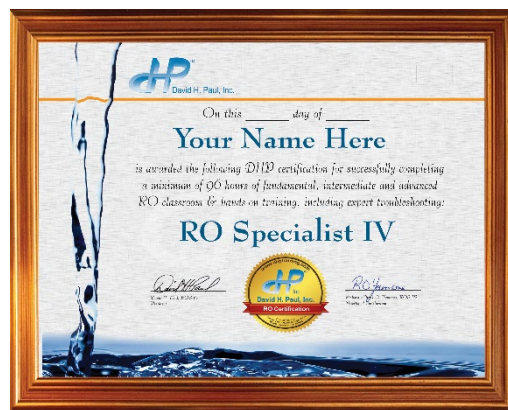


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About This Program

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Overview

David H. Paul, Inc.'s (DHP's) Reverse Osmosis Specialist Certification Program certifies the knowledge and proficiency of personnel who work with reverse osmosis (RO) and nanofiltration (NF) technologies. DHP's definitions:

- Knowledge = understanding of theory, chemistry, monitoring, troubleshooting, etc.
- Proficiency = ability to perform specified tasks related to RO water treatment

DHP's **Reverse Osmosis Specialist Certification Program** has four levels. These are:

Level	What is Learned	Certification
1	RO Fundamentals	Reverse Osmosis Specialist I
2	Intermediate RO	Reverse Osmosis Specialist II
3	Advanced RO	Reverse Osmosis Specialist III
4	RO Mastery	Reverse Osmosis Specialist IV

Certification

- Certifications must be obtained sequentially
 - Examples:
 - You must have Level 1 certification prior to getting a Level 2 certification
 - You must have Level 2 certification prior to getting a Level 3 certification
 - Etc.
 - You may take any DHP seminar anytime you like, even more advanced seminars prior to less advanced seminars, but **RO Specialist Certification** is sequential. Examples:
 - You can complete a Level 2 seminar at any time, but in order to receive RO Specialist II Certification, you must successfully complete RO Specialist I certification prior to receiving an ROS Specialist II certification
 - You can successfully complete the hands-on ROS II certification seminar, then either take the online ROS I certification program or the hands-on ROS I certification seminar. Upon successful completion of the ROS I online or hands-on seminar, you would receive both the ROS I and ROS II certifications.
- Certification is good for 3 years

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Recertification

- Every 3 years you must recertify for the highest certification level you have received
 - Examples:
 - If you have only ROS I certification, you need to recertify for ROS I
 - If you have both ROS I and ROS II certifications, you only need to recertify for ROS II
 - If you have ROS I, ROS II and ROS III certifications, you only need to recertify for ROS III
 - If you have ROS I, ROS II, ROS III and ROS IV certifications, you only need to recertify for ROS IV
- Recertification requires a minimum of **24 hours of additional approved training** and passing a **Recertification Exam** every 3 years
 - **24 hours of additional training**
 - Completing 24 hours of high-tech water treatment training at some time during the 3 years following any certification
 - Examples:
 - You could take 8 hours of training each year for 3 years
 - You could take 16 hours of training one time plus 8 hours of additional training another time within the 3-year time frame
 - You could take one 24-hour training seminar every 3 years
 - All DHP seminars qualify
 - All DHP online courses qualify (cannot repeat the same online course for future recertification...each online course can only be used one time)
 - If a non-DHP seminar, contact DHP for approval
 - Certification expiration is always December 31 three years following certification
 - If you take the next level of certification within 3 years of a previous certification, you don't need to recertify for the lower level(s) individually
 - Examples:
 - If you obtained an ROS I certification on July 1, 2017, it would expire December 31, 2020. If you then obtained an ROS II certification on March 15, 2018 (less than 3 years following the ROS I certification expiration), you wouldn't have to recertify until December 31, 2021.

- If you obtained both an ROS I and ROS II certification on March 15, 2018, they would expire December 31, 2021. If you then obtained an ROS III certification on June 18, 2019 (less than 3 years following the ROS I & II certification expiration), you wouldn't have to recertify until December 31, 2022.

- **Recertification Exam**

- Recertification exams are similar to the Daily Knowledge Exams taken during certification seminars, so no surprises.
- There are 50 questions on a recertification exam
- Recertification exams are online
- Recertification exams may be taken beginning 6 months prior to expiration of a certification.
 - Your certification will expire on December 31, 3 years following certification
 - You can take the recertification exam any time during July 1 through December 31 of that year
- Each exam asks questions concerning the highest level obtained as well as all lower levels
 - Examples:
 - If for ROS I recertification, all questions are from ROS I
 - If for ROS II recertification, the recertification exam will include questions from ROS I and ROS II
 - If for ROS III recertification, the recertification exam will include questions from ROS I-III
 - If for ROS IV recertification, the recertification exam will include questions from ROS I-IV

Certification Requirements

Each level of certification requires:

- Attending a specific 3-day DHP hands-on seminar
NOTE: The only exception is Level 1 (ROS I) which can alternatively be taken online
- Successfully passing daily verifications during the 3-day seminar:
 - Knowledge Verification
 - Proficiency Verification

NOTE: DHP has been teaching individuals since 1988...even those with limited education. DHP knows what people need to know to effectively work with the RO and NF technologies. DHP's world-famous step-by-step, easy-to-understand, enjoyable training methodology ensures that everyone learns the material and passes the verifications.

For details on each level, please click on the links, or scroll down. The four levels are:

- | | |
|--|------------------------|
| • Reverse Osmosis Specialist I | RO Fundamentals |
| • Reverse Osmosis Specialist II | Intermediate RO |
| • Reverse Osmosis Specialist III | Advanced RO |
| • Reverse Osmosis Specialist IV | RO Mastery |

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
- Daily open-book Knowledge Verification Exam to document what was learned
- Hands-on exercises with daily Proficiency Verification Checkoffs documenting the ability to perform activities required to operate, maintain, monitor and troubleshoot RO and NF systems

Reverse Osmosis Specialist I (ROS 1)

Level 1 (ROS I) Certification

- Certificate earned upon completion: RO Specialist I
- What is learned: RO Fundamentals
- Prerequisites for this level*: None

***Prerequisites ONLY apply to certification. You can take ANY DHP seminar on a non-certification basis, at any time and in any order desired**

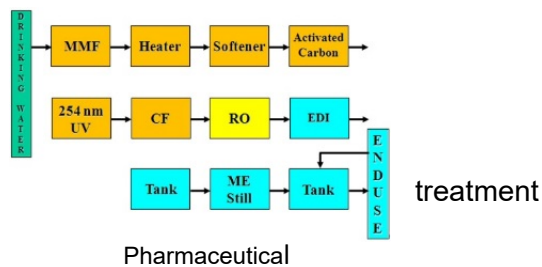


Formats

Online	Hands-On Seminar
31 hours	24 hours (3 days)

What You'll Learn

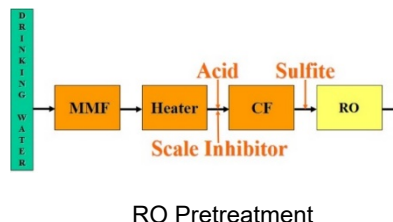
- For both the Online and Hands-On Seminar formats, you'll learn:
- Water contaminants to be removed
- Different challenges with different source waters
- The fundamentals of a water treatment plant
- Water treatment applications
- Conventional and advanced water treatment
- Typical water treatment schemes and what each step does
- How to read Piping & Instrumentation Diagrams
- The fundamentals of RO water treatment



Industrial



Drinking Water



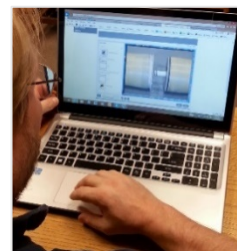
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What You'll Receive

Upon successful completion you will:

- Have completed either 31 hours of online training or 24 hours of hands-on seminar training
- Understand water treatment in general and the RO technology in detail
- Be in the top 10% of water treatment professionals worldwide in your understanding of RO water treatment

Online Courses



Who needs Level 1 (ROS I) certification:

Anyone who deals with RO water treatment needs a minimum of Level 1 certification, including people in operations, engineering, maintenance, instrumentation and control, sales, service, supervision/management, etc.



Hands-On Courses

Level 1 (ROS I) Details

For more Level I detail, please click on the links and/or contact DHP:

- Online: Darrell Cunningham
dcunningham@dhptraining.com
1-877-711-4347
- ROS I Hands-On Seminar: Charles Bedford
cbedford@dhptraining.com
1-877-711-4347

Steps to Register and Purchase

Online training

- 1. Create a FREE Neptune account** (If you have already created an account continue on to 2.)
 - a. Go to neptune.dhptraining.com
 - b. Click on "Create Account".
 - c. Fill out the registration form (Please make sure the email address and last name you use is the same as what you register with for a seminar)
- 2. Log in to Neptune**
 - a. Go to neptune.dhptraining.com
 - b. Enter your username and password
 - c. Click on "Login"
- 3. To Purchase**
 - a. After logging in and loading, click on the "Reverse Osmosis Specialist Certification" button
 - b. Click on "Reverse Osmosis Specialist I (Online Training)"
 - c. Click on "Add to Cart for \$699"
 - d. Follow the on-screen instructions for payment

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Hands-On Seminar

NOTE: An online account is necessary to manage and monitor your ROS certification status.

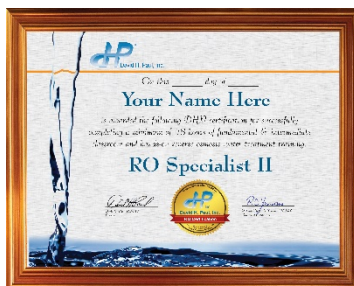
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 - a. Go to neptune.dhptraining.com
 - b. Click on “Create Account”.
 - c. Fill out the registration form (Please make sure the email address and last name you use is the same as what you register with for a seminar)
2. **Log in to Neptune**
 - a. Go to neptune.dhptraining.com
 - b. Enter your username and password
 - c. Click on “Login”
3. **To Register and Purchase a Hands-On Seminar**
 - a. After logging in and loading, click on the “Reverse Osmosis Specialist Certification” button
 - b. Click on “Reverse Osmosis Specialist I (Hands-On Training)”
 - c. Select the seminar you want to attend from the list and click on REGISTER
 - d. Follow the on-screen instructions to register and payment options
(Please make sure the email address and last name you use is the same as what you register with in step 1)

Reverse Osmosis Specialist II (ROS II)

Level 2 (ROS II) Certification

- Certificate earned upon completion: RO Specialist II
- What is learned: Intermediate RO
- Prerequisites for this level*: RO Specialist I Certification

***Prerequisites ONLY apply to certification. You can take ANY DHP seminar on a non-certification basis, at any time and in any order desired**



Formats

Online	Hands-On Seminar
24+ hours	24 hours (3 days)

What You'll Learn

- How to effectively monitor RO units
- How to effectively monitor RO pretreatment
- How to troubleshoot RO units
- How to troubleshoot RO pretreatment
- How to perform hands-on procedures, including:
 - Element loading, unloading & shimming
 - Profiling & Probing
 - Silt Density Index, conductivity, pH, ORP,

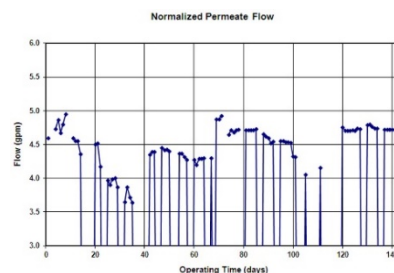


more

What You'll Receive

Upon successful completion you will:

- Have completed 24 hours of intermediate hands-on training
- Understand and be proficient in monitoring and troubleshooting of RO units
- Be in the top 1% of water treatment professionals in understanding of RO water treatment



basic
your

Who needs Level 2 (ROS II) certification:

Level 2 certification is for people who work directly with RO units, such as operators, maintenance personnel, service technicians, etc. who monitor performance and need to know when there is a problem present.

Level 2 (ROS II) Details

For more Level 2 details please click on the link and/or contact DHP:

- ROS II Hands-On Seminar: Charles Bedford
cbedford@dhptraining.com
1-877-711-4347

Steps to Register and Purchase

Online training

1. **Create a FREE Neptune account** (If you have already created an account continue on to 2.)
 - a. Go to neptune.dhptraining.com
 - b. Click on "Create Account".
 - c. Fill out the registration form (Please make sure the email address and last name you use is the same as what you register with for a seminar)
2. **Log in to Neptune**
 - a. Go to neptune.dhptraining.com
 - b. Enter your username and password
 - c. Click on "Login"
3. **To Purchase**
 - a. After logging in and loading, click on the "Reverse Osmosis Specialist Certification" button
 - b. Click on "Reverse Osmosis Specialist II (Online Training)"
 - c. Click on "Add to Cart for \$3270"
 - d. Follow the on-screen instructions for payment

Hands-On Seminar

NOTE: An online account is necessary to manage and monitor your ROS certification status.

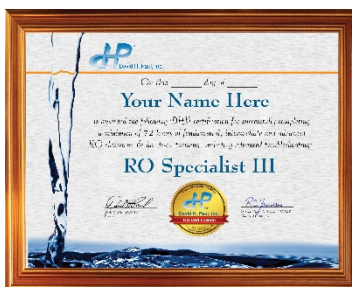
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 - c. Fill out the registration form (Please make sure the email address and last name you use is the same as what you register with for a seminar)
2. **Log in to Neptune**
 - a. Go to neptune.dhptraining.com
 - b. Enter your username and password
 - c. Click on "Login"
3. **To Register and Purchase a Hands-On Seminar**
 - a. After logging in and loading, click on the "Reverse Osmosis Specialist Certification" button
 - b. Click on "Reverse Osmosis Specialist II (Hands-On Training)"
 - c. Select the seminar you want to attend from the list and click on REGISTER
 - d. Follow the on-screen instructions to register and payment options
(Please make sure the email address and last name you use is the same as what you register with in step 1)

Reverse Osmosis Specialist III (ROS III)

Level 3 (ROS III) Certification

- Certificate earned upon completion: RO Specialist III
- What is learned: Advanced RO
- Prerequisites for this level*: RO Specialist II Certification

*Prerequisites ONLY apply to certification. You can take ANY DHP seminar on a non-certification basis, at any time and in any order desired



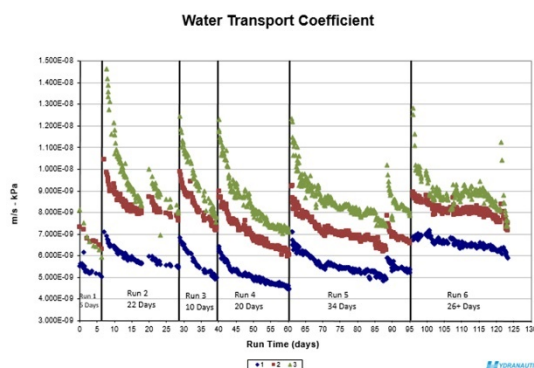
Formats

Hands-On Seminar

24 hours (3 days)

What You'll Learn

- Advanced understanding of RO systems
- Advanced monitoring of RO units
- Advanced monitoring of RO pretreatment
- Advanced troubleshooting of RO units
- Advanced troubleshooting of RO pretreatment
- How to perform advanced hands-on procedures
- Mass balance based on monovalent & ions
- Evaluation of water analyses for scaling fouling potentials

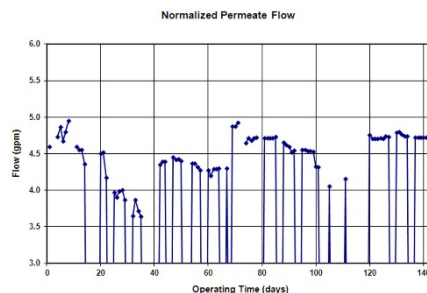


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What You'll Receive

Upon successful completion you will:

- Have completed 24 hours of advanced classroom and hands-on training
- Have an advanced understanding and proficiency monitoring and troubleshooting RO units
- Be in the top 0.1% of water treatment professionals in your understanding of RO water treatment



in

Who needs Level 3 (ROS III) certification:

Level 3 certification is for lead operators, plant engineers, service technicians and anyone else responsible for troubleshooting RO units.

Level 3 (ROS III) Details

For more Level 3 details please click on the link and/or contact DHP:

- ROS III Hands-On Seminar:

Charles Bedford
cbedford@dhptraining.com
 1-877-711-4347

Steps to Register and Purchase

Hands-On Seminar

NOTE: An online account is necessary to manage and monitor your ROS certification status.

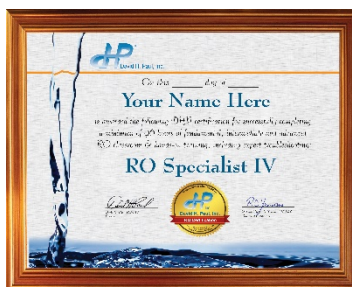
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 - c. Fill out the registration form (Please make sure the email address and last name you use is the same as what you register with for a seminar)
- 2. Log in to Neptune**
 - a. Go to neptune.dhptraining.com
 - b. Enter your username and password
 - c. Click on "Login"
- 3. To Register and Purchase a Hands-On Seminar**
 - a. After logging in and loading, click on the "Reverse Osmosis Specialist Certification" button
 - b. Click on "Reverse Osmosis Specialist III (Hands-On Training)"
 - c. Select the seminar you want to attend from the list and click on REGISTER
 - d. Follow the on-screen instructions to register and payment options
 (Please make sure the email address and last name you use is the same as what you register with in step 1)

Reverse Osmosis Specialist IV (ROS IV)

Level 4 (ROS IV) Certification

- Certificate earned upon completion: RO Specialist IV
- What is learned: RO Mastery
- Prerequisites for this level*: RO Specialist III Certification

*Prerequisites ONLY apply to certification. You can take ANY DHP seminar on a non-certification basis, at any time and in any order desired



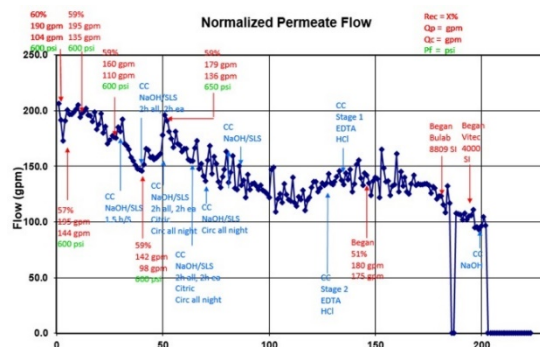
Formats

Hands-On Seminar

24 hours (3 days)

What You'll Learn

- Expert understanding of RO systems
- Expert troubleshooting of RO units
- Expert troubleshooting of RO pretreatment
- Good RO unit design
- Good RO pretreatment design
- Expert evaluation of element autopsy reports
- Operating data evaluations

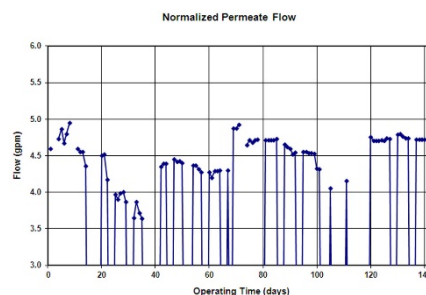


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What You'll Receive

Upon successful completion you will:

- Have completed 24 hours of expert classroom hands-on training
- Be at the mastery level of understanding and in RO water treatment
- Be in the top 0.01% of water treatment professionals in your understanding of RO treatment



and
proficiency
water

Who needs Level 4 (ROS IV) certification:

Level 4 certification is for anyone who wants/needs an RO water treatment master level of understanding and proficiency, such as service technicians, plant engineers, lead personnel, internal/external consultants, etc.

Level 4 (ROS IV) Details

For more Level 4 details please click on the link and/or contact DHP:

- ROS 4 Hands-On Seminar: Charles Bedford
cbedford@dhptraining.com
1-877-711-4347

Steps to Register and Purchase

Hands-On Seminar

NOTE: An online account is necessary to manage and monitor your ROS certification status.

- 1st, Create a FREE Neptune account if you have not already (If you have already created an account continue on to 2.)**
 - a. Go to neptune.dhptraining.com
 - b. Click on "Create Account".
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- 2. Log in to Neptune**
 - a. Go to neptune.dhptraining.com
 - b. Enter your username and password
 - c. Click on "Login"
- 3. To Register and Purchase a Hands-On Seminar**
 - a. After logging in and loading, click on the "Reverse Osmosis Specialist Certification" button
 - b. Click on "Reverse Osmosis Specialist IV (Hands-On Training)"
 - c. Select the seminar you want to attend from the list and click on REGISTER
 - d. Follow the on-screen instructions to register and payment options
(Please make sure the email address and last name you use is the same as what you register with in step 1)

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Benefits

From a Personal Standpoint

- After successfully completing one or more certifications you will be among the top trained RO personnel in the world in your level of understanding and proficiency
- If desired, you can add your certification designation to your signature, bio, etc., for example:
David Paul MS, ROS IV
Reverse Osmosis Specialist IV
- Puts you in a better position for job advancement
- You can't obtain this knowledge and proficiency anywhere else
- The knowledge and proficiencies are real-world and current. Every DHP instructor:
 - Has decades of practical RO water treatment experience
 - Is an RO water treatment consultant
 - Is a professional trainer

From an Employer's Standpoint

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

Extra Fees

The following are extra fees:

- | | |
|--|-------------------------|
| • Replacement Certificate: | \$14.99 USD plus S & H* |
| • Replacement hat: | \$39.99 USD plus S & H* |
| • Replacement pin: | \$14.99 USD plus S & H* |
| • Set of two stickers, 1" & 2" (25 mm & 50 mm): | \$9.99 USD plus S & H* |
| • Recertification Exam: | \$75 USD |
| • Retake Level 1 online Knowledge Verification Exam: | \$50 USD |
| • Retake Level 1 online Proficiency Verification Exam: | \$50 USD |

*Shipping & Handling: \$5.00 within the USA, \$30.00 USD for International

DHP's Certification Qualifications

DHP is uniquely qualified to provide RO water treatment personnel with the practical, real-world, what-you-need-to-know knowledge and proficiencies concerning RO water treatment. In 1977, David Paul, the founder of DHP, was teaching part-time at a branch of New Mexico State University. He was teaching Microbiology and Human Anatomy & Physiology. He needed a job for six months to finish his Master's Degree in Microbiology, which was a requirement to teach full-time. The best paying job he could find was as a water treatment operator at a huge power plant near where he lived. Water treatment was interesting, fun and paid well (better than a university professor).

Brief History

- | | |
|-----------|---|
| 1977-1980 | David was an Industrial Wastewater Treatment Operator of a 600 gpm system. The treatment process included clarification, media filtration, cartridge filtration and reverse osmosis. The RO concentrate went to an evaporator. The concentrate from the evaporator went to solar evaporation ponds. |
| 1980-1981 | David was a Shift Supervisor |
| 1981-1988 | <p>David was the Manager of the industrial wastewater treatment department involved in the design, construction, operation, and maintenance of a nearly \$300 million USD (today's dollars) zero-liquid-discharge industrial wastewater treatment complex utilizing such diverse technologies as clarification, filtration, centrifugation, pressure dewatering, reverse osmosis, distillation, degasification and ion exchange.</p> <p>He was in charge of 35 operators and shift supervisors. There was no training available so David and staff developed one in house. Every week for 3 years, operating personnel read a certain amount of material then took an exam. Successful completion of each year of training resulted in a promotion and pay increase.</p> |

In 1988, David saw that there still was little high-tech water treatment training available anywhere in the world so he founded David H. Paul, Inc. (DHP).

1988-Present

- DHP has trained over 20,000 water treatment professionals since 1988.
- DHP has had four, four-semester, Associate of Applied Science Degree in Advanced Water Treatment training programs at community colleges around the United States, in Farmington, NM; Yuma, AZ; Tampa, FL and San Antonio, TX. DHP's training curriculum and methodology have been approved at four different institutes of higher education in four different states.

- DHP has created and administers a 4,000 page, college-degree-accredited correspondence training program in advanced water treatment (2,000 pages on reverse osmosis water treatment, 2000 pages on high purity water treatment)
- DHP has performed over two hundred consulting jobs, including troubleshooting specific problems, technical assessments, design reviews, bid evaluations, cost reduction audits, market analyses and expert witness services for:
 - Drinking Water Facilities: Many facilities including the largest brackish water and seawater facilities in the world, plus state and federal agencies and U.S. and other armed services
 - Power Generation Industry: Many facilities including both fossil-fueled and nuclear
 - Microelectronics/Semiconductor Industry: Many facilities including some of the largest
 - Pharmaceutical/Biotech Industry: Many facilities including some of the largest
 - Original Equipment Manufacturers
 - Membrane Manufacturers/Suppliers
 - Governmental agencies: Army, Navy, Bureau of Reclamation, cities, counties, etc.
 - Many others

Who at DHP to Contact with Questions

- Email: cbedford@dhptraining.com
- Live Chat Online
 - Available Monday-Friday 7:30-4:30 (07:30-16:30) Mountain Time (UTC: -07:00)
- Speak with a DHP representative toll free at 1-877-711-4347
 - Available Monday-Friday 7:30-4:30 (07:30-16:30) Mountain Time (UTC: -07:00)